Wilson, Karen REDACTED Exemption 6 Personal Privacy

From: Nimmer, Kimberly [kimberly.nimmer@ncdenr.gov]
Sent: Tuesday, October 08, 2013 11:08 AM
To: Wilson, Karen
Cc: Gannon, Rich; Fransen, Tom
Subject: Final FY2013 319 Grant Work plan
Attachments: FINAL-NC-FY2013-319-Workplan.doc

Karen,
Attached is North Carolina's finalized FY2013 319 Grant work plan. The work plans for the eight Incremental projects selected through the competitive process in July have now been added to the FY2013 work plan. All eight projects will soon be entered into DENR's database for contract preparation, with pending January 1, 2014 contract start dates.

Please let me know if you have any questions once you review the Final FY2013 319 Grant work plan. Thank you for your patience and support as we finalized this work plan.

Kim

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Kim Nimmer
319 Grant Administrator
Nonpoint Source Planning Branch
Division of Water Resources
1611 Mail Service Center
Raleigh, NC 27699-1611

Phone: 919-807-6438
Email: Kimberly.Nimmer@ncdenr.gov
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SECTION 319 (h)
FY2013 GRANT WORKPLAN

Combined
Base and Incremental Funds

NC Division of Water Quality
Department of Environment and Natural Resources

September 2012

TABLE OF CONTENTS

Introduction

This document constitutes the work plan for North Carolina's FY2013 319 grant application. It identifies how North Carolina intends to use the estimated $3,455,000 of federal funds being made available to the state this coming fiscal year to address nonpoint source pollution. This Introductory section provides a brief overview of the 319 program and the state's efforts to address nonpoint source pollution. The Budget by Activity Table on page 4 lists all of the activities and their budgeted amounts.

North Carolina NPS Programs

Section 319 of the Clean Water Act authorized the EPA Administrator to make grants under subsection (h) for the purpose of assisting states in implementing approved Nonpoint Source (NPS) Management Programs. The North Carolina Department of Environment and Natural Resources (NC DENR) received final approval of its NPS Management Program in 1989. The NPS Management Plan was updated in 1996 and most recently in 2004. North Carolina is initiating the third revision of its NPS Management Plan in FY2012, and intends to have the updated Plan completed by September 2013. Congress has appropriated funds for grants to states to implement nonpoint source control activities in FY2013 as outlined in their NPS Management Program (http://www.epa.gov/owow/nps/cwact.html).

The 319 grant supports 28 full-time positions in two divisions of the NC DENR, the NC Department of Agriculture, and the Department of Health and Human Services. This 319 grant funding supports staff salaries and fringe costs to conduct NPS programs and implementation activities, as outlined in the NPS Management Program list of milestones. Implementation activities of the FY2013 workplan include: coordination of watershed restoration activities, clean lakes program monitoring and assessment, technical support and enforcement for compliance with animal waste management rules, NPS control for silviculture, agriculture, on-site wastewater disposal, groundwater protection, water quality assessment, NPS modeling, and general Section 319(h) program implementation and administration.

Staff salaries are budgeted for a 12-month period. With the exception of four positions that were moved to the N.C. Department of Agriculture and one position that was relocated to the Department of Health and Human Services in July 2011 due to program realignment as mandated by the N.C. General Assembly, all staff will be located within the Department of Environment and Natural Resources, as with the 205(j)(5), 205(j)(1), and 106 grants.

The work program is subdivided into the base and competitive elements and each element is organized in the following format: Activity name, Overview, Outputs and schedule for completion, State match, Federal request, and Project period.

Through a competitive proposal selection process, the North Carolina NPS Management Program continues to be dynamic and innovative in restoring waters that are listed as impaired by NPS pollution and finding methods to control NPS pollution from a wide variety of potential sources. The Program seeks to address all the major categories of potential sources of NPS pollution through a combination of education, technical and financial assistance, and/or regulation.

The state places a high priority on achieving the proper balance between voluntary and regulatory approaches to NPS control. For example, NPS pollution from agriculture is being addressed through a combination of an annual $5 million state agriculture cost share program, federal cost share programs, a county-level network of technical assistance, special educational initiatives, and regulations such as the nondischarge rules for animal waste management. The state's Clean Water Management Trust Fund also contributes tens of millions of dollars each year to address NPS pollution consistent with recommendations of DWQ's basinwide water quality plans, discussed below. The NPS Management Program Update and the 2012 Section 319 Annual Report provide more detail about the ongoing programs that address agriculture, forestry, on-site wastewater disposal, urban runoff, groundwater, and other NPS activities.

To support the voluntary and regulatory approaches to control NPS pollution, the Division of Water Quality conducts ambient monthly water quality monitoring at approximately 350 stations, and it conducts biological monitoring (benthic macroinvertebrate, fish community and phytoplankton studies) at over 500 fixed and several variable stations during the basinwide planning cycles. This large effort is supplemented with special chemical/physical and biological studies that help to document water quality changes due to the implementation of BMPs, impacts to water quality from various NPS-related activities, and background information for reclassification of waters.

The state has initiated a basinwide management planning effort to control point and nonpoint source pollution in order to increase the efficiency and effectiveness of the water quality protection program. Basinwide water quality planning is a nonregulatory, watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. Basinwide water quality plans are prepared by DWQ for each of the 17 major river basins in the state. Preparation of a basinwide water quality plan is an iterative process. Plans are approved by the NC Environmental Management Commission at least every 10 years. Through this process, the state identifies impaired waters and recommends watershed-based approaches to addressing the problems. By targeting available resources and efforts to problem areas, appropriate adjustments can then be made.

Competitive Grant Selection Process

This grant supports state NPS programs and initiatives as well as special projects that have been selected by the North Carolina NPS Workgroup through a competitive process. The NPS Workgroup is comprised of over 12 state and federal NPS agencies. FY2013 will continue the same process for soliciting and selecting competitive projects that has been in place since FY2008 when the timing for the selection cycle was changed. Projects will not be selected at the time the 319 grant Workplan is submitted to EPA for review. Instead, the Request for Proposals (RFP) will be released and applications accepted closer to the time that the grant is awarded to NC DENR. This shift in the process has run very smoothly since it was implemented in FY2008, allowing North Carolina to know exactly how much funding is available to award when competitive projects are selected. Additionally, award recipients have a greatly reduced waiting time between proposal submittal and receipt of the contract.

The RFP will be developed and released in early February 2013, with applications for FY2013 funding due in late May 2013. Once applications are received, each will be screened to confirm it meets EPA's funding criteria. Eligible proposals will be distributed to staff of the Division of Water Quality and the NPS workgroup for review. The proposals will be evaluated and scored based on the following four criteria, with a maximum possible total score of 50 points:

1. Merit (25 points)
    a. Measurable results proposed (10 points)
    b. Quality/integrity of application (10 points)
    c. Preparedness and/or Momentum of project (5 points)
2. Capabilities of Principal Investigator to carry out proposed activities (10 points)
3. Relevance and value to NPS Program Plan - proposal addresses one or more action plan items from NPS Program Management Plan, proposal addresses priorities identified in RFP (5 points)
4. Budget / Timeline (10 points)

Given the complexities of the watershed restoration projects, time spent by DWQ staff to help recruit qualified proposals, and extra effort required of DWQ Planning staff to work with applicants to improve their proposals to satisfy 319 Program requirements, the projects will be selected by DWQ staff. Watershed project proposals will be provided to the NPS Workgroup for their review and feedback. Review comments submitted by the NPS Workgroup will be considered in an advisory capacity by DWQ staff when projects are selected for funding. The top proposals will be invited for interviews with DWQ staff and NPS Workgroup members. DWQ staff will then meet separately and select projects for funding. The number of watershed projects selected will depend on the funding amount requested by each proposal and the amount of 319(h) grant funding available to North Carolina.

Assurance Statements

All GIS data produced will be consistent with Executive Order #12906, Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure, Section 3(b), "Standardized Documentation of Data."

It is expected that some of the competitive projects selected for FY 2013 funding will have a monitoring component, which will require a Quality Assurance Project Plan (QAPP). The QAPP is necessary when the monitoring data is in support of compliance, development of standards or to provide the platform for future regulation. Such projects will have an approved QAPP before any monitoring related activities will be reimbursed by 319 grant funds.

Printed matter and signage produced for projects will indicate the source of funding as Section 319 monies granted by the USEPA.

The following workplan describes the activities to be funded in FY 2013 under Section 319 (h).

FY 2013 Budget by Activity

ID#	Recipient	Project Title	Fed. FTE	State FTE	319 Funding	Match	Total
		Base Programs					
B-1	DWQ	Nondischarge Permitting and Enforcement	3	1	$249,172	$77,923	$327,095
B-2	DWQ	Clean Lakes Program	2	0	$148,019	0	$148,019
B-3	DWQ	Basinwide NPS Planning and Management	2	0	$171,382	0	$171,382
B-4	DWQ	NPS Program Implementation	1	14.5	$63,298	$918,232	$981,530
B-5	DWQ	Section 319 Program Administration	3	0	$204,185	0	$204,185
B-6	DWQ	Ground Water Base Program	2	1.5	$138,446	$130,776	$269,222
B-7	DWQ	Estuary Monitoring and Assessment Team	1	0	$79,640	0	$79,640
B-8	DWQ	NPS Modeling	2	0	$158,965	0	$158,965
		BASE PROGRAM TOTAL	**16**	**17**	**$1,213,107**	**$1,126,931**	**$2,340,038**
		Non-Competitive Base Programs					
NCB-1	NCFS	Forestry NPS Program	3	2	$304,904	$203,269	$508,173
NCB-2	DSWC	Agricultural NPS Pollution Control	1	1	$104,687	$69,791	$174,478
NCB-3	DLR	Erosion and Sedimentation Control	1	0	$63,000	$111,600	$174,600
NCB-4	DPH	On-site Wastewater Disposal	1	1	$60,290	$40,213	$100,503
		NONCOMPETIVE BASE TOTAL	**6**	**4**	**$532,881**	**$424,873**	**$957,754**
		BASE TOTAL			**$1,745,988**	**$1,551,804**	**$3,297,792**

ID#	Recipient	Project Title	Fed. FTE	State FTE	319 Funding	Match	Total
		Non-Competitive Incremental Programs					
NCI-1	DWQ	Nutrient Framework Implementation	3.5		$291,581	$0	$291,581
NCI-2	DWQ	Watershed Implementation	3		$228,498	$0	$228,498
		NON-COMPETITIVE INCREMENTAL TOTAL	**6.5**	**0**	**$520,079**	**$0**	**$520,079**
		Competitive Incremental Projects					
I-1	City of Hendersonville	Britton (Brittain) Creek Stormwater Management – Mud Creek Watershed Restoration Project			$121,528	$260,322	$381,850
I-2	Town of Pittsboro	Stormwater BMPs in the Town of Pittsboro and Robeson Creek Watershed			$161,726	$107,864	$269,590
I-3	NCSU	Engaging Youth in Improving Burnt Mill Creek through High Prioirty Storm Water Retrofits			$198,938	$133,240	$332,178
I-4	NCCF	Cleaning Up the Water around Oak Island, NC			$114,694	$77,371	$192,065
I-5	DSWC	Implementation of Nine-Element Watershed Restoration Plan in the Dan River Basin			$295,000	$330,486	$625,486
I-6	NCSU	Implementing and Evaluating Stormwater BMPs in Durham			$64,052	$45,823	$109,875
I-7	NCSU	Implementation of the Regenerative Stormwater Conveyance Technology to Stabilize an Erosional Gully			$132,854	$94,992	$227,846
I-8	Char-Meck Storm Water	Briar Creek Stream Restoration			$100,141	$645,724	$745,865
		COMPETITIVE INCREMENTAL PROJECTS TOTAL			**$1,188,933**	**$1,695,822**	**$2,884,755**
		TOTAL INCREMENTAL FUNDING			**$1,709,012**	**$1,363,714**	**$3,072,726**
		TOTAL FY 2013 GRANT			**$3,455,000**	**$2,915,518**	**$6,370,518**

BASE PROGRAM ACTIVITIES

Activity B-1: Nondischarge Permitting and Enforcement (DWQ)

a. Overview

As the population of North Carolina grows and the waste assimilation capacity of the state's streams is diminished, nondischarge alternatives for treated wastewater disposal are becoming more prevalent. The nondischarge permitting program consists of all wastewater treatment and disposal systems that do not discharge directly to surface waters. The exceptions are wastewater collection system permits issued by the Division of Water Quality's Pretreatment, Emergency Response and Collection Systems (PERCS) Unit and wastewater disposal permits issued by the Division of Environmental Health's Onsite Wastewater Section for subsurface septic systems. Nondischarge systems are typically designed to treat wastewater, then reintroduce that water to the environment through land application techniques that can contribute nonpoint source pollution if not engineered, constructed and operated correctly. North Carolina regulations require that applicants for NPDES permits must first consider nondischarge alternatives. The state has over 1,515 existing treatment and disposal nondischarge permits for activities including groundwater remediation, residuals disposal and reuse, spray irrigation, evaporation, infiltration, reclaimed water reuse, and recycling. These complex systems often require intensive evaluation and site work and their numbers are expected to continue to increase. In addition, the state realized an increase in the number and size of animal feeding operations beginning in the 1990's. The state has approximately 2,400 permitted wastewater generating animal operations, the greatest number of large animal operations (i.e. concentrated animal feeding operations as defined in 40 CFR Part 122.21) in Region 4. More information on each program area is provided below.

Animal Waste Management Systems

In North Carolina, water quality protection rule establishment for animal operations began in the early 1990's and has evolved to its present form (15A NCAC 02T). Statewide there are over 2400 permitted confined animal feeding operation facilities. Nearly 800 of these facilities are located within the 11-county Fayetteville Region. Recent State legislation has lifted a decade long moratorium (effectively prohibited new production facility development) and now opening the door for new or expansion of existing facilities. To qualify for a new or expanding facility permit, a more complex wastewater treatment and disposal system is now required. . Within the Fayetteville Region the permit reviews of this type are conducted by the staff funded through the 319 grant.

Following several lagoon breaks that resulted in significant water quality impairment in 1995, DWQ completed an inspection of all operations to evaluate the adequacy of the waste management systems and the operations of these systems. The animal waste management

program began in 1997 with the permitting of existing, expanding and new animal waste management facilities for the following size operations:

≥ 250 swine,
≥ 100 cattle,
≥ 75 horses,
≥ 1,000 sheep, and
≥ 30,000 confined poultry with a liquid wastewater management system.

There are approximately 2,400 facilities that require permitting, most of which are swine. General permits were first issued for three main categories of operations in 1996 – Cattle, Poultry, and Swine. A recent 5-year renewal of the general permits was conducted in 2009. In addition, three additional general permits have been developed under the Federal NPDES program for animal waste management systems that fall under the Federal criteria (State criteria is more stringent than Federal). The above requirements were codified into 15A NCAC 02T .1300 in September of 2006.

In August 1997, a moratorium on new or expanding lagoons was enacted. At the same time, the Attorney General negotiated a settlement agreement with Smithfield Foods to research environmentally superior technologies for animal operations. The evaluation process ended in 2006, with one waste treatment technology being approved. However, it is not a requirement that existing farms convert to this new technology.

In 2007, legislation was passed that required any new or expanding swine farm to meet a series of environmental performance standards, similar to the Smithfield Agreement described above (Senate Bill 1465). The legislation permanently prohibited lagoons for new or expanding swine farms. The standards for new or expanding swine farms were incorporated into 15A NCAC 02T .1300 in 2008. The 2007 legislation also provided limited funding to help convert existing farms to these new technologies. The Division is responsible for evaluating and approving any new or expanding swine farms under these new requirements.

In 2008, EPA updated the CAFO rules to incorporate the requirements of the 2005 2nd Circuit Court ruling. In July 2009, the General Assembly ratified House Bill 1175 to incorporate the 2008 CAFO rule into statute by reference. Staff will continue to work with EPA to ensure consistency between the state program and federal requirements.

DWQ is statutorily responsible for permitting new facilities, reissuing existing permits on a 5-year cycle, annual compliance inspections, and enforcement of the rules at approximately 2,400 farms. Permitting includes review of the nutrient management plan (NMP) to ensure that waste is applied at agronomic rates to protect water quality. Annual Compliance inspections involve travel to animal waste management systems to conduct on-site inspections of farm records and facility conditions for compliance. Compliance activities include things such as issuing notices of violation (NOV), completing documentation for enforcement actions, testifying in court as needed, and assisting with certification classes. The technical assistance role has greatly increased for DWQ due to recent budget reductions that eliminated the sister agency of NCDENR that previously was tasked with that primary

mission (effective July 1, 2011). Within the Fayetteville Region, engineering technical assistance is provided by the staff funded through the 319 grant.

Over the last two decades in North Carolina there has also been a large expansion of poultry operations being established. The waste systems are primarily dry litter type and by Rule do not require the same level of permitting or inspection oversight as the liquid waste animal operations. However the DWQ is tasked with responding to complaints and the water quality degradation effects that sometimes accompanies poorly managed waste storage and or application.

Wastewater Residuals

Almost all wastewater treatment facilities generate residuals during the treatment process. Most residuals are land applied to agricultural fields as a soil amendment and a fertilizer source. These residuals are treated to reduce pathogens and vector attraction. Residuals are also limited on pollutant levels as well. Some residuals are treated to a higher level and held to more stringent pollutant levels. These residuals are allowed to be distributed without significant restriction to the general public – mainly as a soil amendment (e.g. compost). There are approximately 178 land application programs, 96 distribution programs, and 13 surface disposal programs permitted at this time. EPA has in place rules (40 CFR Part 503) governing municipal and domestic residuals programs. North Carolina is not delegated to implement the 503 program for EPA at this time. However, North Carolina incorporates all of EPA's requirements in our residuals permitting program. North Carolina had applied for delegation, but EPA has indicated that rule making was required. The state pursued rule making to allow delegation to move forward. These rules were effective in September of 2006.

The Division's residuals management permitting program is designed to foster efforts to reduce nonpoint source (NPS) pollution and protect or restore water bodies impaired by NPS pollution. A key requirement of these rules is to restrict residuals application at or below agronomic rates. Presently, the residuals program is focused on crop nitrogen needs. The Division is evaluating historical phosphorus loading from the residuals management program and its impact to phosphorus concentrations in the soils. The Division intends to use the evaluation to update program requirements to more effectively manage phosphorus loading from the residuals program and further control NPS loading of nutrients to the waters of the state.

Within the Fayetteville Region alone there are 696 residual application fields totaling 19,739 acres. Each site is visited during the permitting process and compliance inspections during land application events are conducted as often as staff schedules allow. Within the Fayetteville Region many of these activities are conducted by the specific staff funded through the 319 grant.

Non-Discharge Wastewater Disposal

This category of non-discharge permits includes all permits associated with the treatment and disposal of wastewater that is not discharged directly to surface waters except subsurface disposal systems. North Carolina's anti-degradation policy requires wastewater systems to evaluate nondischarge systems prior to entering the NPDES permit process. These are the preferred alternative to discharge type (i.e., permitted through the NPDES program) systems. These systems include (total systems permitted or under review are in parenthesis): industrial recycle systems (95), irrigation systems (783), utilization of reclaimed water (128), infiltrative/evaporative ponds (12) and high-rate infiltration systems (65). These systems are reviewed to ensure that no discharges are likely if properly managed, protection of the environment, and protection of public health. Irrigation and reclaimed water systems are increasing in number and complexity. These systems are considered more frequently as an alternative to direct discharge permits. In addition, reclaimed water systems are used to offset potable water demand, meet NPDES mass limits, and to demonstrate environmental stewardship. Within the Fayetteville Region the permit reviews and site visits are conducted by the staff funded through the 319 grant.

Watershed & Impaired Stream Restoration Activities

The Fayetteville Regional staff has worked in three watersheds that contain impaired streams over the last 3-4 years. The activity includes maintaining an inventory of DWQ permitted facilities and activities within the watershed along with thorough facility inspection, field observations that include field parameter measurements and sampling for laboratory analysis, data review and concentrated reconnaissance of the watershed to identify non-permitted nonpoint sources of contamination. In addition to this activity, the Fayetteville Region monitors surface water quality routinely in areas that contain large numbers of permitted facilities (generally CAFO type) by collecting field parameters along major stretches of navigable streams. Within the Fayetteville Region the 319 funded staff position is heavily involved in this program activity.

b. Project Milestones

This activity supports Action Items 1-3 under Objective 1 of Goal 1 (Protection) as listed in the 5-Year Action Plan for the Groundwater Section of the NC NPS Management Program.

c. **Outputs (limited to Non- Concentrated Animal Feeding Operations)**

1. Review and issue of permits for nondischarge waste systems:

Permit type	Number Permitted Annually (based on 2008-2009 data*)
Surface irrigation	200
Reuse (including reuse lines)	50
Recycle	20
Pump and haul	30
Other (evaporation, infiltration and groundwater remediation not covered under federal remediation programs)	30
Residuals	70

* Session Law 2009-406 extended non-discharge permits, eliminating permit renewals for 2009-2010. The 2008-2009 data better represents the expected permit load into the future.

2. Conduct approximately 140 site inspections (issued under output #1 above).

3. Perform permitting and compliance activities on animal operations: (Limited to Non-CAFOs)

Outputs	Statewide
Issue/Renew State Program Permits	310
Issue Notice of Violations	125
Execute Enforcement Actions	12

d. State Match

This activity will be partially funded by the state Department of Environment and Natural Resources in the amount of $77,923, which will serve as direct match for the overall Section 319(h) grant. The match will be provided in the form of salary, fringe benefits, and operating costs for one FTE regional office staff that helps to implement the nondischarge permit program. It should be noted that the overall staff funded by the State for permitting and inspection of the systems mentioned above is much larger than that shown as a match.

Salary (1 FTE)	$60,000
Fringe	$17,923
Travel	0
Supplies	0
Other	0
Indirect	0
Total	**$77,923**

e. Federal Request:

DENR will support three staff salaries and associated fringe benefits.

Salaries (3 FTEs)	$168,381
Fringe (3 FTEs)	$53,015
Indirect (16.7%)	$27,776
Total	**$249,172**

f. Project Period:

October 1, 2012 to September 30, 2013

Activity B-2. Clean Lakes Program

a. Overview

This request provides for Lake Water Quality Assessments (LWQA) according to Section 314(a)1. The assessments would use monitoring results to assist with listing threatened and impaired lakes on the State section 303(d) lists and meeting the reporting requirements for lakes in the Integrated Report under section 305(b), and will also be used to gage the impacts of any restoration efforts being conducted in the lake's watersheds. Specific evaluations would be conducted at approximately 76 sites on at least 27 different lakes using methods previously approved and funded through EPA Region IV Clean Lakes Projects. These lakes were chosen based on the rotating Basinwide 5-Year Schedule and their uses with priority given to water supplies, high recreational use, outstanding resource waters and high quality waters. A preliminary list of lakes to be sampled as part of the LWQA is included as Table 1.

In addition to the LWQA's in Table 1, two impaired lakes would be evaluated more intensively. Falls of the Neuse Reservoir is on the North Carolina 303(d) list due to elevated chlorophyll *a*, low dissolved oxygen and elevated turbidity. The Falls of the Neuse Reservoir study would track progress on restoring the water quality of this lake year-round at eleven stations. Jordan Lake, impaired for chlorophyll *a*, turbidity, and elevated pH, has an EPA approved TMDL and State mandated nutrient management strategy aimed at reducing nutrient loads from point and non-point sources in the 1,686 square mile watershed draining to the lake. The Jordan Lake study would track progress in restoring water quality in the lake year-round at nine stations. Lake Rhodhiss has exceeded state pH standards since 2006. Monitoring of three existing Clean Lakes Program sites on Lake Rhodhiss would provide enough data to determine if voluntary reductions from point and non point sources would be sufficient in attaining pH standard in the lake.

Methods and quality assurance information for all LWQAs are available on the web at (http://portal.ncdenr.org/web/wq/ess/isu). The State will list the sampling results along with use assessments in the update of the Environmental Sciences Section's Basin Assessment Documents (http://portal.ncdenr.org/web/wq/ess/reports) and the North Carolina Integrated Report (http://portal.ncdenr.org/web/wq/ps/mtu/assessment).

b. Milestones Supported

The proposed work will serve to meet Action 1 of Objective 1 and Action 1 of Objective 3 for Goal 1 (Protection) and Action 1 of Objective 5 for Goal 2 (Restoration) of the NPS Management Program 5-Year Action Plan.

c. Output

Lake Water Quality Assessments will be posted on the web and reported in the state's Integrated Report. Individual assessments and data summaries will be furnished on request. Future yearly evaluations will include 25 to 30 different lakes. Project updates and final documents will be

made available on the web.

The data collected will be used to target management efforts to lakes that are not meeting their current uses. Data will be used to determine the need for and implement, as appropriate, more stringent non-point source management requirements, permit limits, and standards in the lakes and their watersheds. The success of these management efforts will be measured in future LWQAs as they rotate through the basinwide 5-year monitoring schedule.

Table 1. Lakes to Be Sampled As Part Of The LWQA For 2012-2013

Yadkin- Pee Dee River Basin							
8 Digit HUC			Surface Area	Mean Depth	Volume	Watershed	Sampling
LAKE	COUNTY	CLASSIFICATION	(acres)	(feet)	($x10^6 m^3$)	(mi^2)	Sites
3040101							
KERR SCOTT RESERVOIR	WILKES	WS-IV B Tr	1451	39	189.00	348	3
WINSTON LAKE	FORSYTH	C	25	8	0.03	7	1
SALEM LAKE	FORSYTH	WS-III CA	360	18	0.80	26	3
3040103							
HIGH ROCK LAKE	DAVIDSON/ROWAN	WS-IV, V B CA	15750	16	314.00	3929	11
LAKE THOM-A-LEX	DAVIDSON	WS-III CA	650	26	7.80	39	2
TUCKERTOWN RESERVOIR	STANLY/MONTGOMERY	WS-IV B CA	2550	33	289.00	4210	2
BADIN LAKE	STANLY/MONTGOMERY	WS-IV B CA	5350	46	344.00	4116	4
FALLS LAKE	STANLY/MONTGOMERY	WS-IV B CA	203	33	177.00	2552	2
LAKE REESE	RANDOLPH	WS-III CA	600	16	0.90	100	3
MCCRARY LAKE	RANDOLPH	WS-II HQW	15	10	0.90	1	1
LAKE BUNCH	RANDOLPH	WS-II HQW CA	30	10	0.04	2	1
BACK CREEK LAKE (LAKE LUCAS)	RANDOLPH	WS-II HQW CA	250	13	5.00	16	3
3040104							
LAKE TILLERY	STANLY/MONTGOMERY	WS-IV B CA	5264	33	207.00	4834	4
BLEWETT FALLS LAKE	ANSON/RICHMOND	WS-IV,V B CA	2570	39	8.30	6784	1
3040105							
KANNAPOLIS LAKE	ROWAN	WS-III CA	289	16	5.20	11	2
LAKE FISHER	CABARRUS	WS-IV CA	277	15	3.20	78	3
LAKE CONCORD	CABARRUS	WS-IV CA	131	12	1.30	4	3
LAKE LEE	UNION	WS-IV CA	125	5	9.50	51	3
LAKE MONROE	UNION	WS-IV	140	18	1.80	9	3
LAKE TWITTY (LAKE STEWART)	UNION	WS-III CA	82	18	7.60	36	3
LAKE HOWELL (CODDLE CREEK RES	CABARRUS	WS-II HQW CA	1300			47	3
3040201							
ROBERDEL LAKE	RICHMOND	WS-III CA	100	10	10.00	140	3
ROCKINGHAM CITY LAKE	RICHMOND	WS-III	27	2	0.02	20	1
CITY POND (WADESBORO)	ANSON	WS-II HQW CA	100	8	0.10	9	2
WATER LAKE	RICHMOND	WS-II HQW CA	47	10	0.06	20	2
HAMLET CITY LAKE	RICHMOND	C	100	3	0.04	10	2
Lumber River Basin							
8 Digit HUC			Surface Area	Mean Depth	Volume	Watershed	Sampling
LAKE	COUNTY	CLASSIFICATION	(acres)	(feet)	($x10^6 m^3$)	(mi^2)	Sites
PAGES LAKE	MOORE	B	40	2	0.03	14	2
LAKE WACCAMAW	COLUMBUS	B SW ORW	8950	2	54.30	70	3
LAKE TABOR	COLUMBUS	B SW	70	1	0.03	10	2

d. State Match

No state match is required for this activity.

e. Federal Request:

This request will support staff salary and fringe. See Table 2 for budget details.

Table 2. Budget Details for LWQA

Salaries (2 FTEs)	
Fringe (2 FTEs)	
Indirect (16.7%)	
Total	**$148,019**

f. Project Period:

October 1, 2012 to September 30, 2013

Activity B-3. Basinwide Management (DWQ)

a. Overview

In 1990, the NC Division of Water Quality (DWQ) initiated a statewide watershed-based approach to water quality planning and protection called basinwide management. Basinwide water quality planning is a nonregulatory, watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. Basinwide water quality plans are prepared by DWQ for each of the 17 major river basins in the state. Preparation of a basinwide water quality plan is an iterative process. Plans are approved by the NC Environmental Management Commission at least every 10 years.

This approach entails coordinating and integrating DWQ activities such as water quality monitoring, modeling, use support assessments, and planning and management implementation by river basin and watershed. Water quality and aquatic resources data are assessed for an entire river basin, leading to the development of basinwide water quality plans and the management strategies and initiatives presented within the plans. A major thrust of the basinwide approach is to bolster efforts to restore streams impaired by nonpoint source pollution. Basin planning is integrated into North Carolina's Watershed Restoration Program.

A basinwide plan is prepared for each river basin in order to communicate to policy makers, the regulated community, and the general public the state's rationale, approaches, and long-term strategies for each basin. The plans are circulated for public review and comment. To the best of DWQ's abilities, based on available resources and staff, implementation of the plan is coordinated with local entities. Nonpoint source pollution reduction recommendations are presented in each plan to aid local and state groups in the development of site-specific restoration strategies. The plans have been used as watershed restoration plans for many Section 319 restoration (incremental) proposals, as well as for proposals to the North Carolina Clean Water Management Trust Fund and for Ag Cost-Share Funds.

The funding under this activity will be used to support a basinwide planner and supervisor position. The basinwide planner has responsibility for directing the planning, preparation, and finalization of basinwide water quality plans for selected river basins in the state. This responsibility includes public outreach and nonpoint education activities such as participating in public workshops and meetings, speaking to various interest groups, and coordinating with state and federal agency personnel and local watershed groups on plan development and implementation. The planner provides input into activities of local watershed groups and natural resource agencies, as well as point source discharger organizations similar to the Tar-Pamlico Association.

The supervisor oversees the basinwide planning and Use Restoration Waters (URW) programs. The URW program focuses on restoring NPS-impaired waters. This position currently supervises four basin planners and the URW program coordinator and has responsibility for scheduling, workload management, general administrative activities, 319 updates and yearly reports.

b. Milestones Supported

This activity supports Actions 1, 3, and 4 of Objective 1; Action 1 of Objective 2; and Action 2 of Objective 3 for Goal 1 (Protection) as well as Action 1 of Objective 2; Action 3 of Objective 3; Action 1 of Objective 4; and Action 2 of Objective 5 for Goal 2 (Voluntary Watershed Restoration) established under the NC NPS Management Program 5-Year Action Plan.

c. Outputs

A number of basinwide planning and implementation activities will be conducted. These include the following:

1. Conduct solicitation for water quality information from outside sources for Neuse, Broad, White Oak, Chowan and Pasquotank river basins. This activity entails emailing request from the emailing list database for these basins, including NPDES dischargers, phone calls, and attending and conducting meetings.
2. Compile and review outside and DWQ water quality data for the Neuse, Broad, White Oak, Chowan and Pasquotank river basins to assist with identification of priority waters for restoration and protection. Outside data can include reports, data, watershed restoration plans, and other information useful in determining the status of water quality and water quality protection and degradation in a river basin.
3. Compile permitting, land use and population data for use in identification of sources and priority watersheds.
4. Develop Action Plans for Neuse, Broad, White Oak, Chowan and Pasquotank river basins.
5. Conduct public input phase for developing draft basinwide water quality plans for the Cape Fear, Roanoke, White Oak, Savannah, Watauga, Hiwassee, Little Tennessee, Chowan, Pasquotank and Neuse river basins. This activity entails presentations and meetings with other state and federal agency staff, local watershed groups, NPDES discharger coalitions, local governments, etc.
6. Present Cape Fear, Roanoke, White Oak, Savannah, Watauga, Hiwassee, Little Tennessee, Chowan, Pasquotank and Neuse Basinwide Water Quality Plans to the Water Quality Committee and Environmental Management Commission for final approval.
7. Post final Cape Fear, Roanoke, White Oak, Savannah, Watauga, Hiwassee, Little Tennessee, Chowan and Pasquotank River Basinwide Water Quality Plans on the DWQ website.
8. Conduct implementation meetings on action plans for river basins with DWQ staff and others. This activity entails meeting with appropriate resource agency staff and local watershed groups to review plan recommendations, discuss current and future water quality challenges, and actions towards implementing recommendations. A comprehensive review of the Nutrient Management Strategies currently in place is part of this activity.
9. Continue to coordinate with river basin coalitions, resource agency staff and watershed groups to identify high priority waters and issues of relevance to that group, and identify potential means to address the issues. This activity entails providing technical assistance and guidance on water quality initiatives developed and implemented at the local level.

10. Continue to coordinate with division staff on TMDL development and implementation. This activity will entail coordinated and focused efforts in impaired watersheds and may lead to working with local stakeholders to address land use and watershed impacts.
11. Continue to coordinate with watershed stakeholders on developing sound grant proposals and 9-element watershed planning processes. This activity will entail coordinated and focused efforts in impaired watersheds, as well as those with noted impacts to prevent impairment. The activity involves working with local stakeholders to identify actions needed to address land use and watershed characteristics and impacts.
12. Oversight of all basinwide plan development including updates of schedules for plan development.
13. Oversight of the URW program.

d. State Match

There will be no state match associated with this activity.

e. Federal Request: The budget is to support two staff salaries and fringe benefits.

Salaries (2 FTEs)	$116,066
Fringe (2 FTEs)	$36,176
Indirect (16.7%)	$19,140
Total	**$171,382**

f. Project Period: October 1, 2012 to September 30, 2013

Activity B-4. NPS Program Implementation: NPS Program Support and Classifications (DWQ)

a. Overview

Classifications and Standards Unit and Basinwide Planning Unit Program Implementation includes the review of NPS-related laws, rules, and regulations; coordination with other lead agencies for NPS control; education and training in compliance with NPS related rules; development of new rules and designated uses with NPS components such as the stormwater control requirements for new Outstanding Resource Waters and High Quality Waters watershed classifications, and review of technical data with outputs of graphs and trends illustrating water quality conditions.

Implementation of existing rules with NPS-related components is a high priority within DWQ. Development of classifications and standards to protect designated uses of waterbodies involves NPS-related controls. Through development and implementation of watershed management practices for Outstanding Resource Waters, High Quality Waters, Trout Waters, and Water Supply Watershed Waters designations, the Classifications and Standards Unit is involved with NPS-related activities. Several of the watershed classifications are implemented through other agencies and local governments; therefore, making consultation with the various involved parties an important component. The Classifications and Standards Unit develops and works closely with other agencies to develop brochures, informative fact sheets and maps. To keep information available and current through the Division web page, regular updates are necessary on a continual basis.

The Classification and Standards Unit is involved in the development of NPS-related special management strategies in response to protection of existing uses. Examples of these activities are the Classifications and Standards Unit lead roles in development of rules related to protection of Federally-listed Threatened and Endangered Aquatic Animal Species.

Staff within the Classifications and Standards Unit and Basinwide Planning Unit makes public appearances across the state, including presentations at local government planning meetings, stakeholder meetings, and public hearings; all of these functions provide opportunity to "advertise" the importance of the NPS related rules, in general.

b. Outputs

- Coordinate with agencies to ensure consistent implementation of NPS-related programs and rules.
- Update and development of materials such as water supply watershed maps, outstanding resource waters maps, high quality waters maps, trout waters maps and other watershed classification data layers.
- Continue reclassifications to apply the water supply watershed protection rules.
- Coordinate data for development of rules for special management strategies for threatened and endangered aquatic species.
- Coordinate development of special management strategy rules where necessary to protect existing uses such as trout fisheries.

- Continue work on designated use classifications for waterbodies and implement the associated NPS-related rules.
- Work with DENR staff and others to gather local watershed information to assist with interpretation of data.
- Review 303(d) list for river basins to ensure accuracy
- Summarize data for river basin planning including ambient data and other data such as special study data.
- Assist both CSU and BPU with developing and updating river/hydrologic unit maps for use by unit staff utilizing ArcView and other GIS programs.
- Assist both CSU and BPU with GIS map development.
- Data collection from various sources and maintaining the most up-to-date data and keeping it available for CSU and BPU staff.
- Providing QA and QC of databases for use by CSU and BPU staff.

c. State Match

This activity will be partially funded by the state Department of Environment and Natural Resources, which will serve as direct match for the overall Section 319(h) grant. The match, $918,232, will be provided in the form of salaries and fringe benefits for central office staff that help implement the NPS Management Program.

Salaries (14.5 FTEs)	$688,976
Fringe (14.5 FTEs)	$229,256
Total	**$918,232**

d. Federal Request:

Salaries (1 FTE)	$41,723
Fringe (1 FTE)	$14,607
Indirect (16.7% of salary)	$6,968
Total	**$63,298**

e. Project period: October 1, 2012 to September 30, 2013

Activity B-5. 319 Grant Program Administration (DWQ)

a. Overview

There are numerous duties and responsibilities related to the administration of the Section 319 program, including: reporting requirements (annual reports, closeout reports, and annual workplans), grant preparation, contract preparation and compliance, site visits to ensure project outputs and timely progress, entry of load reduction data into EPA's GRTS database, personnel-related tasks, data management, and attending EPA-sponsored Section 319 conferences. The budget for this activity covers the salary and associated fringe benefits for three staff in DWQ: the 319 Coordinator, 319 Assistant Coordinator, and 319 Program Administrative Assistant.

Three staff are responsible for the successful annual funding and oversight of a suite of NPS management positions and projects, and the ongoing, concurrent oversight of five years worth of grants. They are essential and instrumental in achieving the NPS water quality protection and restoration that is afforded and leveraged by the grant.

b. Project Milestones:

This activity supports Action 5 of Objective 1; Actions 3 and 4 of Objective 2; and Action 2 of Objective 2 for Goal 1 (Protection) as well as Action 3 of Objective 3; Actions 1-4 of Objective 4; and Action 2 of Objective 5 for Goal 2 (Voluntary Watershed Restoration) of the NC NPS Management Program's 5-Year Action Plan.

c. Outputs:

- Prepare annual and closeout reports as required.
- Prepare FY2013 Section 319(h) grant application and manage approved workplan.
- Develop Request for Proposals to solicit competitive projects, with EPA and NPS Workgroup input.
- Coordinate and direct the interview and selection process for competitiveprojects.
- Develop and administer workplans and contracts.
- Participate in EPA-sponsored Section 319 and other appropriate NPS conferences.
- Disseminate information regarding EPA rules, regulations and guidance on the 319 program to state NPS agencies.
- Obtain training for and update the Grant Reporting and Tracking System (GRTS).

d. State Match - There will be no state match associated with this activity.

e. Federal Request:

Salaries (3 FTEs)	$136,005
Fringe (3 FTEs)	$45,798
Indirect (16.7% of salary)	$22,382
Total	**$204,185**

f. Project Period: October 1, 2012 to September 30, 2013

Activity B-6. Protect surface water from nonpoint source contaminants by controlling the pollution of groundwater, monitoring groundwater quality, and preventing the movement of polluted shallow groundwater into surface water. (DWQ)

a. Overview

The Division of Water Quality protects groundwater by managing wastes applied to the surface or distributed, requiring cleanup of contaminated groundwater, and monitoring the quality of groundwater to determine resource protection and restoration needs. The major nonpoint source goals of the State aquifer protection program are to protect surface water from contaminants by preventing runoff of wastes to surface water, and to enhance the quality of impaired and impacted waters by controlling the movement of polluted shallow groundwater into surface water.

Non-discharge Permitting and Compliance Monitoring

The regional nondischarge permitting program is responsible for ensuring compliance of residual and wastewater effluent at land application facilities. The program also includes those facilities that utilize reclaimed wastewater for beneficial purposes, a practice that ultimately leads to greater conservation of the water resource. Groundwater monitoring is required at many of these facilities throughout the state. The regional offices ensure compliance with groundwater standards through a split-sampling program where DWQ staff regularly collects groundwater samples at these facilities which are analyzed by the DWQ laboratory. Recent groundwater monitoring required at the coal ash producing electric generation facilities across the state has added additional responsibilities to this task.

In the Asheville region, the state's largest coal ash structural fill site was begun four years ago. With over 2 million tons of ash to be used in the total project, potential impacts to surface and groundwater are being avoided through enhanced engineering initiatives, frequent compliance inspections and active groundwater and surface water monitoring.

Current and Historical Use Pesticides

In the last decade, North Carolina has experienced periods of rapid housing development and its associated farmland loss to development has ranked the state 3rd in the nation for total acres of farmland loss (2007 Natural Resources Inventory). Development of farmland and specifically development of fruit orchards with their histories of intensive pesticide and herbicide application creates their own unique setting for impacts to groundwater and surface water in addition to residential inhabitants of these areas. Some counties in western North Carolina have had greater than 50% reduction in the number of acres in fruit orchards in the last 20 years. Identification using GIS tools and assessment of areas converted from orchards to developed land is necessary in identification of potential impacts to surface waters, groundwater and health risks to residents through soil exposure.

But while North Carolina has experienced growth, agriculture remains a substantial part of the economy with the state ranking as 8th in the nation for agricultural production in 2004. In the western portion of the state, intensive but limited vegetable production has had an adverse impact on surface waters through stormwater runoff. Current vegetable production practices

involve more dense plantings and greater use of impervious materials placed under the plants to retain soil moisture that invariably increase stormwater runoff of soil. Results of stormwater sampling in areas downstream of these areas indicate soil particles are carrying residual or historical pesticides once used at the farms into the surface waters. Modern pesticides and herbicides have also been detected in lower frequency. Monitoring in the Mills River for example, where adjacent row crop agriculture is present, has shown episodic declines in the health of benthic communities downstream of crop plots. Additionally, approximately 50,000 people consume water collected from intakes immediately downstream. Two stems of the Mills River are listed on the 303(d) list. Efforts to address the impairment listing will likely necessitate fundamental changes in farming practices.

The Asheville Regional Office hydrogeologist II supported by 319 funds is the key coordinator and project manager of this watershed effort. Future assessments will include the determination of impacts from groundwater discharging to surface waters since most commercial agricultural operations are set in areas underlain by alluvium and therefore readily capable of discharging impacted groundwater to the adjacent stream.

Recent experience in North Carolina show that groundwater may be a significant contributor to impairment of surface waters, and that new information and new management strategies are necessary to advance watershed restoration efforts in certain watersheds. For example:

- The Neuse Nutrient Sensitive Waters Management Strategy in the Neuse Basinwide Plan (DWQ, 2009) indicates that groundwater may be a significant pathway of nutrient loading to the Neuse Estuary but that loading from groundwater sources is not being captured in the overall nutrient accounting process. The Neuse NSW Management Strategy calls for efforts to characterize the potential for groundwater contamination and transport of nutrients from biosolids and wastewater land application fields to the surface waters of the Neuse Basin.
- The Science & Technical Advisory Committee of the Albemarle-Pamlico National Estuary Program has advocated the establishment of watershed-specific groundwater standards which consider the effects of downstream loading and pumping withdrawal to protect surface water quality for aquatic and terrestrial life, not just human health (http://www.apnep.org/pages/stac_papers.html).
- Land-applied residuals and wastewater have been documented to be discharging nutrients to nutrient sensitive waters in at least one example in North Carolina, and the magnitude of this discharge has been estimated through detailed studies. Other instances are known or suspected to be occurring, even at well-managed facilities; however, the number and magnitude of these occurrences is unknown.

Without specific knowledge of the role of groundwater as a contributor to watershed impairment, it is not possible to develop the management strategies or other actions that may be necessary in order to implement effective watershed restoration plans.

b. Milestones Supported

This activity supports Actions 1-3 of Objective 4 for Goal 1 (Protection) as well as Actions 103 of Objective 1 for Goal 2 (Restoration) of the NC NPS Management Program's Groundwater Program 5-Year Action Plan.

c. Tasks and Outputs

The NPS 319 groundwater program base grant supports nonpoint source pollution goals by performing assessments of nonpoint source pollution impacts, monitoring groundwater quality in the context of impact on surface water, and by controlling pollution sources that may impact groundwater and surface water. DWQ state funded permit staff serve as match for this project. Specific program activities to be accomplished and outputs include:

(a) The Hydrogeologist will perform hydrogeological evaluations related to permitted and regulated waste discharge activities, including animal waste management activities; manage pollution incident sites and provide advanced hydrogeological expertise, including design and implementation of assessments studies, to regional office programs related to aquifer protection, aquifer sustainability efforts, groundwater resource evaluation studies, and watershed assessment and restoration activities occurring in the 19 counties for which the Asheville Regional Office is responsible. The primary duties of this position include the following:

(1) Evaluate the design, construction, and closure of systems for land application of wastes, including coal ash ponds and coal ash structural fill projects. Conduct inspections and investigate unscheduled releases from holding facilities as they may impact groundwater and adjacent surface waters.
(2) Conduct and coordinate a split sampling program for all permits with groundwater monitoring requirements, including coal ash ponds and coal ash structural fill projects. Manage a regional monitoring and data review program in order to determine compliance with applicable rules.
(3) Review assessment, corrective action, facility closure and monitoring plans related to soil and groundwater contamination at agricultural sites and other sites that fall under the jurisdiction of the Division of Water Quality. The goal of the review process is to determine if the environmental cleanups at the sites are consistent with the general statutes, rules and guidelines. The impact of pesticides applied at former orchards is particularly important in the Asheville Region.
(4) Design and implement regional programs that determine impact of groundwater contribution on impaired surface waters from non-point sources, determine aquifer susceptibility relating to land use, population growth etc., and to assess and restore impacted watersheds including understanding the interconnection of surface water and groundwater.

Outputs

- Perform compliance inspections, review assessment data (groundwater monitoring, lagoon closure, etc.) and review permits issued:

Activity	Frequency/year
Review and provide evaluation for non-discharge permit applications (as influx provides)	20
Perform compliance inspections	10
Manage a program to collect and evaluate compliance	14

monitoring of groundwater at NPDES and non-discharge permitted sites requiring groundwater monitoring	
Review and provide comment on soil and groundwater assessments for closure activities at non-discharge facilities	5
Groundwater remediation permits (UIC)	10
Manage groundwater incident sites under APS jurisdiction	25

- Report on the impact of agricultural pesticide applications on groundwater and surface water quality in the Mills River, a 303(d) listed impaired watershed. Report will summarize analytical data collected to-date, progress of technical advisory committee and stakeholder process, discussion of progress toward 303(d) list removal, etc.
- Report on the spatial extent and degree of impact from former orchard activities that retain residual pesticides in soil and groundwater at potentially harmful levels. Report will identify any areas where former orchard activities culminate with groundwater discharge areas and stream impairments.
- Investigate and report on spatial extent and persistence of naturally occurring arsenic in residential water supply wells within the ARO.
- Investigate and report on pollution incidents at residential water supply wells. Manage groundwater and/or soil contamination sites under the jurisdiction of the APS.
- Review 303(d) listed streams in region annually to determine if impacted groundwater contribution is an impairment factor.

(b) The Environmental Specialist will support the implementation of a more robust and effective NPS program in North Carolina through the following major efforts which have a specific geographic focus, providing strong science and data on which to base action, and provide knowledge and data necessary to set priorities and develop integrated solutions:

(1) Compilation of watershed-based nutrient loading estimates: DWQ issues permits for land application of nutrients in the form of wastewater and residuals. There is currently no information on the magnitude of this load relative to other loads or any TMDL, and this load is assumed to be zero when TMDLs are developed. This position will complete compilations of nutrient loading estimates for selected watersheds, including watersheds selected by DWQ regional offices for intensive watershed restoration projects, so that DWQ and its partners can develop effective strategies for restoration in nutrient-sensitive watersheds.

(2) Characterization of ambient groundwater quality by watershed: In order to identify the degree to which groundwater may contribute to watershed impairments and therefore to select appropriate integrated strategies for restoration, this position will use new and existing data sources to develop characterizations of groundwater quality in watersheds selected by DWQ regional offices for intensive watershed restoration projects. In FY2012, this position will begin expanding groundwater quality assessments based on pilot projects completed in FY2010 and FY2011.

(3) Improvement of DWQ spatial data for land-applied wastewaters and residuals: In order to identify contributors to NPS pollution within a given watershed, it is critical that DWQ's databases used in water quality planning and compliance work include accurate and complete spatial data. This position will continue to conduct periodic audits of the completeness and accuracy of geographic data associated with land application permits,

with particular focus on ensuring that complete spatial data is available for permitted facilities in watersheds selected by DWQ regional offices for intensive watershed restoration projects. This position will also use this information to develop recommended standard operating procedures for spatial data collection and to identify information technology needs to store and manage spatial data.

Outputs

- Report on watershed-based nutrient loading estimates and how these estimates were incorporated into watershed restoration plans or other DWQ activities for assessment and management of NPS pollution
- Report on ambient groundwater quality characterizations and how these characterizations were incorporated into watershed restoration plans or DWQ activities assessment and management of NPS pollution
- Report on audits of spatial data in DWQ permitting databases and efforts to improve completeness and accuracy of geographic data in DWQ databases

(c) State 319 match positions – State-funded Environmental Supervisors and regional office staff of the Aquifer Protection Section of DWQ will review and issue permits for the protection of groundwater and surface water quality from municipal, industrial, commercial, and animal waste storage and disposal, and assure maintenance of water quality standards. A state-funded Environmental Program Consultant reviews state regulations applicable to land-applied wastewater and residuals in light of hydrogeologic data and studies to determine their effectiveness and any needs for improvements.

Outputs

- Review and issue at least 90 permits (dependent on influx of permit applications).
- Report on the number of permits reviewed and issued for each of the following categories: municipal, industrial, commercial, and animal waste storage.
- Report on reviews of land-applied wastewater regulations and assessments of land application impacts on surface waters and groundwater.

d. State Match - Review and issue permits for land application of wastewaters and residuals and perform compliance evaluations. Provide state funded groundwater support to the North Carolina 319 NPS program.

Source of Funds	***Activity***	***Amount***
Non-Federal Match (DWQ—GW)—1-Year Project		
Salary	DWQ Groundwater staff (1.5 FTEs) *Hydrogeologist (1 FTE) $61,490* *Env. Supervisor III (0.5 FTE) $39,350*	$100,840
Fringe	DWQ Groundwater staff-fringe (1.5 FTEs) *Hydrogeologist (1 FTE) $18,697* *Env. Supervisor III (0.5 FTE) $11,239*	$29,936
Total		$130,776

e. Federal Request – Support for a Hydrogeologist and an Environmental Specialist.

Salaries (2 FTE)	$91,969
Fringe (2 FTE)	$31,118
Indirect (16.7%)	$15,359
Total	**$138,446**

f. Project Period: October 1, 2012 – September 30, 2013

Activity B-7. Estuary Monitoring and Assessment (DWQ)

a. Overview

Staff is assigned to provide intensive and routine assessment of water quality issues in the Lower Neuse and Pamlico and surrounding areas. The focus is primarily on nutrient-related work in the Neuse, Tar-Pamlico and Chowan River Basins, all three of which are classified as Nutrient Sensitive Waters, as well as monitoring and assessment work in the Roanoke and Pasquotank.

As indicated by the TMDLs, over 75% of the nutrient loading into these systems can be attributed to non-point source pollution. The data collected is essential in assessing the effectiveness of the nutrient sensitive water rules and the Neuse and Tar-Pamlico nutrient TMDLs, which is in direct support of Element #6 the Framework for Managing Nitrogen and Phosphorus Pollution. The staff workload has expanded to the Roanoke, Chowan, and Pasquotank River basins. As a result, the monitoring and assessment of routine long-term monitoring studies has increased over 50%, and now includes at total of 69 monthly monitoring sites.

Water quality issues in the Pamlico and Lower Neuse Rivers and other estuarine waters dictate frequent evaluation and response by the Division of Water Quality (DWQ). Vast areas of North Carolina's estuaries require large boats and well trained staff for water quality assessment programs to be scientifically conducted in these challenging environments. Environmental conditions and evaluations associated with a response to fish kills, algal blooms, or other environmental investigations in coastal water bodies requires dedicated and talented staff. Assessments include collection of data and immediate transfer of those data to decision makers in the areas of fisheries, environment, and human health. Scientific knowledge regarding harmful algae blooms and decisions on actions associated with human health are additional challenges supported by this work.

Staff is trained in water quality issues and capable of assessing and/or collecting samples for a variety of potential water quality problems. Staff supports ongoing activities in the regional and central offices of DWQ and works with university researchers or other agencies to collect environmental data, fish, or other organisms according to specific needs. Other duties include assisting in maintenance of continuous monitors, citizen complaint investigations, buffer rule investigations, mapping of submersed aquatic vegetation, and enhanced communications within the local area.

Enhanced communication by staff includes working with local residents who frequent the waters of the Neuse, Pamlico, and adjacent coastal waters such as commercial fishermen, tour boat captains, fishing guides, and other individuals who are often the first to observe indications of degraded water quality.

b. Milestones Supported

This activity supports Action 1 of Objective 3 for Goal 1 (Protection) and Action 1 of Objective 5 for Goal 2 (Voluntary Watershed Restoration) for the NC NPS Management Program's 5-Year Action Plan.

c. Outputs:

- Conduct monthly ambient monitoring sampling, including nutrients, for physical and chemical parameters at sites in the Neuse, Tar-Pamlico and Chowan River basins, all of which are classified as Nutrient Sensitive Waters and prioritized for nitrogen and/or phosphorus reductions.
- Conduct monthly ambient monitoring sampling for physical and chemical parameters at sites in the Pasquotank and Roanoke River Basins.
- Conduct probabilistic sampling at 4 monthly random ambient monitoring sampling sites for physical and chemical parameters.
- Continue nutrient sample collection on a weekly basis at 5 sites.
- Investigate approximately 10-20 fish kills and12 algae blooms.
- Respond daily to questions from citizens and inter/intra agency staff on water quality issues, fish kills, etc.
- Conduct 40 riparian buffer determinations and prepare reports.
- Assist the Washington Regional office with compliance investigations (buffer/401 violations), preliminary water quality data (site visits as part of permit process) in NSW river basins.
- Assist the Washington Regional office with compliance investigations (buffer/401 violations), preliminary water quality data (site visits as part of permit process) in the Pasquotank and Roanoke river basins.
- Provide SAV survey data to permitting agencies immediately, and make data available to all interested parties via website during this time period.

d. State Match: There is no state match associated with this activity.

e. Federal Request:

Budget Category & Items	**Amount**
Estuary Monitoring Salary (1 FTE)	$53,700
Fringe (1 FTE)	$17,105
Indirect (16.7% salary)	$8,835
Total	**$79,640**

f. Project Period: October 1, 2012 to September 30, 2013

Activity B-8. NPS Modeling (DWQ)

a. Overview

The development and implementation of NPS Total Maximum Daily Loads (TMDLs) was identified as the focus of 319 Incremental funding in EPA's 2003 NPS Program Guidelines. In addition, in EPA's review of watershed-based plans (July 2011), modeling was identified as an area needing improvement: "[I]t is critical that the best effort be made to develop good estimates; set a bar to measure whether or not the proposed measures are adequate; and establish a feedback loop to determine if there are additional issues in the watershed that may have been missed when the plan was first written." Several examples of where this accountability approach has been successfully applied include the Neuse River and Tar-Pamlico basins (nutrients), Jordan Reservoir, and the 319-funded Lockwoods Folly (shellfish) project. Modeling is essential to the effective implementation of such projects as captured in this article on the Lockwoods Folly TMDL. http://www.starnewsonline.com/article/20100721/ARTICLES/100729931/1155?Title

Since 2003, TMDLs have provided the foundation for twelve 319-funded implementation projects. Ten of those projects have achieved final combined pollutant reductions of 308,875 pounds per year of nitrogen, 92,778 pounds per year of phosphorus and 59,118 tons of sediment. These figures are conservative since they only capture the one-time loading reduction rates at the ends of the contracts and not the cumulative totals for ensuing years. The other two projects are relatively new, so no reduction figures have yet been reported. It is also noted that two of these projects contributed to two success stories (Fourth Creek TMDL, 2003) and two projects that showed progress towards achieving water quality goals (Neuse and Tar-Pamlico River Basins).

The two staff funded by the 319(h) grant develop nonpoint source TMDLs in the Modeling & TMDL Unit of the NC Division of Water Quality, with a focus on prioritized watersheds, including coastal shellfish waters. The development of TMDLs requires coordination with the Division of Soil and Water Conservation, DWQ regional offices, and other entities that manage nonpoint source pollution. These positions conduct mathematical analyses of data to develop TMDLs and support watershed modeling using GIS analysis to provide data on sources of nonpoint source pollution. They also compile site-specific information on land use and nonpoint sources, including agriculture, nutrient application, and onsite wastewater treatment, which assists in TMDL implementation and other NPS restoration activities.

These positions will provide modeling inputs to watershed plans and help ensure that all significant water quality problems in the watershed are successfully addressed. The modelers will also assist with the identification of significant sources of water quality impairment and identify the management measures that will most effectively address those sources, ensuring that the on-the-ground restoration efforts that follow will be successful.

The modelers work with local stakeholders, such as river basin associations, NC Coastal Federation, and state agencies to include implementation plans for TMDLs and provide reasonable assurance that the NPS portions of TMDLs are implemented. Specifically, they

support restoration efforts in impaired coastal shellfish waters to reduce nutrients and turbidity. These areas have been prioritized for TMDL development.

b. Milestones Supported

This activity will support Action 1 of Objective 3 for Goal 1 (Protection); Objectives 2 and 3, and Action 2 of Objective 5 for Goal 2 (Voluntary Watershed Restoration) for the NC NPS Management Program 5-Year Action Plan.

c. Output

Support for on-the-ground projects through:

- Investigating causes, stressors, and sources of impairment and performing water quality data analyses to characterize NPS impairments, needed to develop watershed restoration plans
- Developing nonpoint source TMDLs to abate NPS impairment. DWQ plans to develop 20 NPS TMDLs in FY2013. The two FTEs described in this section as well as the position covered in section NCI-2 all contribute to this goal.
- Developing TMDL implementation plans in collaboration with local organizations
- Evaluating documents, plans, and models submitted for NCDWQ review as needed to ensure technical soundness and consistency with planned and approved TMDLs.
- Updating modeling and TMDL information in DWQ's Watershed Restoration, Assessment, and Protection Superstructure (database), which allows DWQ and other agencies to track projects.
- Reviewing and preparing responses to public comments on TMDLs.
- Performing water quality assessments for North Carolina's Integrated Report.
- Creating datasets and performing GIS analyses in support of TMDL development.

d. State Match

There will be no state match associated with this activity

e. Federal Request:

Salary (2 FTEs)	$107,172
Fringe (2 FTEs)	$34,160
Indirect (16.7% salary)	$17,633
Total	**$158,965**

f. Project Period:

October 1, 2012 to September 30, 2013

NON-COMPETITIVE BASE ACTIVITIES

Activity NCB-1: Forestry NPS Pollution Prevention Program

Overview:

The North Carolina Forest Service (NCFS or Forest Service) annually conducts between three to four thousand forestry site inspections to both monitor and document forest operator compliance with the statewide regulations called the "Forest Practices Guidelines Related to Water Quality" (15A NCAC 01I .0100-.0209), otherwise known as the FPGs. A diversified Forestry Non-Point Source (NPS) Pollution Prevention Program supports a sustained high level of compliance with North Carolina's nine FPG performance standards. The NCFS's NPS Program provides customers with the most current, technologically feasible, and economically practical Best Management Practice (BMP) resources to conduct forest management actions on North Carolina's 18.0+ million acres of forestlands while ensuring the State's surface and ground water resources are adequately protected. Specific products and services provided to forest operators and forestland owners include BMP Manuals, specialized BMP-related literature and videos, and on-site BMP technical assists. The release of the 2nd Edition Forestry BMP Manual and 1st Edition Forestry BMP Quick-Reference Field Guide in 2006-07 was a major accomplishment for the NPS Branch and stakeholders. The information provided in the 2011 BMP Manual Revision "Lessons Learned" Report is being applied to our next manual revision. The information transfer of our BMP publications' contents, such that it reaches all primary (forest operator) customers, will be a continued goal of the NCFS over the coming years. The Forestry NPS Program also provides educational and training opportunities for internal and external customers that includes continued development of BMP exhibits and displays within the Forest Service's seven Educational State Forests (ESFs) and State Demonstration Forests located across North Carolina. These BMP end-products are supported by in-house training, education, and research to ensure that all NCFS employees charged to deliver the NCFS's NPS pollution prevention program possess the most current forest water quality protection information and tools. External training primarily takes the form of NCFS team-teaching at ProLogger base and continuing education curricula focused on protecting water quality and conserving soil resources. The addition of the BMP Tailgate for Loggers Project takes the classroom to the forest to educate hard-to-reach customers engaged in forest management, but lacking either the time or monetary resources to commit to learning in a formal classroom setting.

Additional nonpoint source-related initiatives include planning, oversight, and management of state/federal grant and highway mitigation-funded stream restoration projects on NCFS-managed properties. These stream and river restoration projects well fit the mission of the NCFS as it serves to manage and sustain NC forestlands and the resource found in those forests. And, based upon the strategies that were formulated in the 2010 *North Carolina Forest Action Plan* and subsequent FY2011 grant funding received from USDA Forest Service's Redesign Grants, the Forestry NPS Branch is now working on projects that will deliver free, online BMP preharvest planning services to forest operators and landowners, as well as site-specific water and riparian management strategies to urban forest landowners and formal forest management training to municipal watershed managers. [Note: Due to other NPS Branch project priorities, three USFS Redesign Grants funded in FY2011 are being extended by the federal grantor to September 30, 2014.] These

non-traditional aspects of forest and water management will complement the traditional forestry BMP program delivery that is primarily aimed at silvicultural and forestry site operations such as harvesting, road work, and site preparation. The water resource related goal, objectives, and strategies (Chapter 5, Goal #6) of the NC Forest Action Plan are available on the NCFS website (http://www.ncforestactionplan.com/).

Personnel and Matching Funds:

The Forestry NPS Branch is comprised of a staff of three full-time and two part-time employees; the Branch is located within the NCFS's Central Office (CO) in downtown Raleigh; the NPS Branch accomplishes project management to achieve the goals of multiple NPS-related and associated grant initiatives described below. Project-related fieldwork is performed by Branch staff and is also accomplished by NCFS's nine Water Quality Foresters (WQFs). These state-appropriated WQF positions were established in 1999 and 2005 and are used as a non-federal match to the 319 Grant funding the Forest Service receives annually. Other state-funded service forester, forest ranger, and forest technician personnel working across the state also contribute a portion of their work time to addressing water quality and nonpoint source issues. Accounting for all water protection, restoration, and education funds either obtained or being pursued, the Branch's total CY2013-2014 operational/project budget is projected to be about $426,000; funding sources outside of this 319 Grant will include a mix of USFS Redesign Grants, and other federal and state grants. Thus, the 319-Grant monies presently supporting the NPS Branch's salaries/fringe and base operations continue to be used to leverage other grantors to support NCFS's NPS pollution prevention objectives.

Additional Funding Opportunities:

Since the Forestry NPS Branch was established, but especially in the last three to five years, Branch staff and NCFS management have pursued additional or supplemental grant award opportunities for funding both on-the-ground projects and NPS Branch personnel salary and fringe benefits. Recent examples of successful grant awards include the American Recovery & Reinvestment Act (ARRA; also known as federal stimulus funds); USDA-Forest Service State & Private Forestry Cooperative Program, NCDWR's Water Resources Development Project Grant Program, and Weyerhaeuser Inc. However, permanent funding sources for Branch FTEs still remains a high priority for the NCFS, particularly in light of the water quality strategies identified in the 2010-2015 Forest Action Plan. Thus, the NPS Branch Supervisor (Forest Hydrologist) continues to work to secure a diversity of federal, state, and private grants, and other monetary funding to move forward on NCFS's pollution prevention projects and sustain NPS Branch operations through this decade.

Program Administration Capacity:

In July 2012, a part-time, temporary administrative professional position was re-established within the Forestry NPS Branch after having lost an administrative FTE position due to a 2009 reduction-in-force. Unlike previously, this re-instated position is only a part-time position (i.e., less than 30 hours per week), but still provides close support to the Branch Supervisor in budget management, reporting, grant research and solicitation, and overall program administrative matters. The goal is continue to retain this part-time administrative support position to relieve the Branch Supervisor from a portion of administrative duties, thus allowing him more time to engage in BMP project-related field work and technical assistance, WQ special projects, and to advance

grant initiatives. Also in 2013, a part-time, temporary Water Quality Technician was employed by the Branch to assist with field work specific to the BMP Implementation and Effectiveness Monitoring Projects, including water discharge/quality monitoring of a number of forestry-related stream crossings within NC's Piedmont region. This temporary position will be used short-term to complete a relatively heavy project field work load occurring in the 2013-14 timeframe.

Forestry BMP Implementation and Effectiveness Monitoring:
A core function of the Forestry NPS Branch is to evaluate and report on the degree of implementation of voluntary forestry BMP's as well as assess the effectiveness of BMPs in preventing or controlling NPS pollution from forestry activities.

The fourth-cycle of forestry BMP Implementation Surveys is expected to be completed in 2014 and a fifth cycle will be implemented in 2015. These recurring periodic assessments of logging sites allow the NCFS to understand where and how BMPs are being implemented, and will provide a feedback mechanism for future refinement or development of forestry BMP's as they appear in our BMP Manual. As with the third BMP survey, NPS Branch staff anticipates a rapid delivery in the data analysis and final report phases of this project, based on survey process refinements that occurred in 2012. The NPS Branch personnel now employ electronic data capture in the field and integrated database management and statistical analysis that collectively supports the project's final report being issued in a period of several weeks as opposed to many months or longer. In addition to the stratified random survey approach employed, the Branch's project leader will also explore the possibility of offering same-day BMP survey feedback to loggers per their job request. This added customer service would be separate from the project itself. Such a service is now doable because of the electronic data capture and seamless data analysis capabilities. Thus, a logger could receive same-day feedback on a given tract's level of forestry BMP implementation. Each requested site-specific report would include any applicable recommendations needed to improve overall BMP implementation on the site. The primary benefit of this timely feedback would be that forest operators would be able to take action on applicable BMP recommendations while the logger's heavy equipment is still located on the tract being harvested or managed in some capacity.

The NPS Branch staff will continue to maintain their oversight on the Forestry BMP Effectiveness Monitoring Project (i.e., Paired Watershed & Stream Crossing Studies) that will continue to be co-funded by the USDA-Forest Service Southern Research Station's Eastern Forest Environmental Threats Assessment Center (EFETAC) into 2014. This cooperative study effort with EFETAC, an organization based on the campus of N.C. State University's Centennial Campus, will yield valuable information on streamside management zone width and management, and multiple types of stream crossings typically used in forestry operations. The pretreatment monitoring has been ongoing since late 2007 and harvest treatments concluded in 2011. The project deliverables will be used to determine the future development and direction of North Carolina's forestry BMPs and will serve as a foundation for recommending any necessary revisions to the FPG performance standards to NCFS management and the NCFS's Forestry Technical Advisory Committee. By 2014, this paired watershed's primary scope of work will be completed with approximately six years of water quality and hydrologic data having been collected; a final project report on the paired watershed studies will be produced in 2014. The stream crossing studies that have also been occurring in the Piedmont will also be winding down.

To date, eight crossings have been monitored with another eight to twelve crossings planned for monitoring through 2014. Branch staff anticipates an active outreach schedule of presentations on this project to a diversity of forestry-stakeholder and other audiences in 2014-2015. To date, many on-site tours of this project's paired watersheds have been provided to local university students and forestry professionals from North Carolina, the United States, and other foreign countries. Although this project will officially conclude in 2014, there are ongoing discussions between NCFS and EFETAC, and the land stakeholders, NCSU Forestry Department and NCDA&CS, to determine if the designated paired watersheds should continue to serve as a multiagency FM/WQ research platform. Specifically, the viability of these watersheds for future studies on biomass harvesting and nutrient budgets is presently being discussed.
The continued presence of satellite University studies being conducted in the paired watersheds over the past five years is also a driver to maintain the watersheds for forest-water quality research. The outcome of these future study discussions cannot be predicted at this time; however, the Forestry NPS Branch staff will continue fostering such conversations with our technical and financial partners to see if additional BMP application-relevant monitoring opportunities can be implemented to the benefit of NCFS customers.

Forest Operator BMP Training:

The Forestry NPS Branch coordinates and delivers training and education to loggers, landowners, foresters, timber buyers and others in the forestry community. This outreach primarily occurs through cooperation with the North Carolina Forestry Association's (NCFA) ProLogger Program. The NPS Branch, in partnership with the NCFA, continues to build a diversified toolbox of forestry BMP resources in the form of literature, videos and on-the-ground exhibits and demonstrations. The NPS Branch will also continue to supplement the classroom-based ProLogger Program with a 2012-developed BMP training project. The 'Tailgate BMPs For Loggers' Project is a classroom administered outdoors at active timber harvest sites to reach loggers (and their employees) that have had minimal exposure to formal BMP training, due to time and financial constraints or a lack of interest in participating in a BMP classroom setting. Branch staff anticipates a growing demand for this service as more forest operators become aware of this low-operational impact training opportunity. Also training related, the GIS-Based Preharvest Planning Project is now funded and will be developed in 2012-2014 as a free, web-based tool available to all forest operators and forestland owners. This project when completed will allow customers to create a BMP pre-harvest plan that accounts a number of site-specific variables including topographic, hydrologic and soil characteristics. The Forestry NPS Branch will share this online technology with other southern state forest agencies to facilitate creating more regional BMP preharvest planning freeware.

Watershed Stakeholder Training

A new and innovative project was federally funded in 2011 and will be developed in 2012-2014 that provides forest management training to municipal watershed managers across the state. The development of a FM Plan that includes site-specific pre-harvest BMP planning, implementation and maintenance will be emphasized. This multi-state (TN, FL, AR and NC) initiative is being funded by a USDA Forest Service Redesign Grant. The training will include webinar, classroom and field contact time with attendees; follow-up site visits and recommendations will be offered to attendees to facilitate appropriate management of forested watersheds used to support delivery of potable municipal water supplies. The NCFS anticipates this project will be a mainstream

gratis service provided to NC's watershed managers by 2015. The demand for this new watershed service should be moderate to high based on feedback received by NPS Branch staff attending the 2012 Southeastern Partnerships for Forestry and Water Quality Meeting in Greenville, SC. Meeting attendees included municipal water supply operators and water authorities from both South Carolina and North Carolina towns and cities. Attendees expressed interest in receiving this FM-based watershed training.

Stream Restoration:
Another highlight of the NCFS's NPS program is the continued opportunities for stream and wetland restoration. Initiated in 2006, these restoration projects are solely conducted on state-owned lands managed by the Forest Service. These projects represent another tool for educating school groups and the general public about the value of managing water resources to protect them and what it takes to restore streams and wetlands once they are degraded. As most of our existing and planned projects are located on educational state forest and state 'demonstration' forest properties, they are open to the public, highly visible, and well trafficked. To enhance the completed project's outreach component, we incorporate stream trails and kiosk-housed signage on restored stream reaches to educate and inform visitors about the nature and purpose of the work. Additionally, these restoration sites serve as research and demonstration platforms for the Forest Service and its technical partners to serve as a leader in monitoring the re-establishment of riparian vegetation to create a successive forest environment that supports the restored water resources.

Multiple restoration projects have been completed thus far, amounting to approximately 5,100 cumulative linear feet; additionally and 2 acres of wetlands having been restored. These projects require post-restoration monitoring of the site conditions (hydrologic function; vegetation status; stream bank stabilization, etc.). The Forestry NPS Branch and its technical partners at the NCSU Department of Biological & Agricultural Engineering's Stream Restoration Program continue to monitor and maintain these completed projects. Professional outreach on our most recent project on Lake Julia Outfall (Dupont State Forest, Transylvania County) has already drawn over 90 stream restoration and federal/state regulatory professionals to the site for tours associated with regional stream restoration workshops conducted by NCSU.

During this funding period, we anticipate continuing post-restoration monitoring for the stream restoration project at Claridge Nursery in Wayne County that is part of a cooperative effort with the N.C. Department of Transportation (NCDOT) related to on-site compensatory mitigation for road construction. During 2012, stream easement negotiations were completed and recorded in the Nursery property deed. The NCDOT has accelerated the road construction schedule to 2012-2013 and the actual stream restoration is presently slated for completion in 2013. Approximately 8,700 linear feet of stream will be restored of "The Canal", which is a modified natural stream that is a tributary to the Little River near Goldsboro, which itself flows into the Neuse River. The additional funds needed to support post-construction monitoring of the stream restoration would come from a pending grant award from NCDOT's R&D Unit to NCSU via ITRE – Institute for Transportation Research & Education. More information on ITRE can be found at http://itre.ncsu.edu/.

Future Forestry NPS Program Delivery Opportunities:

The water quality/NPS pollution prevention objectives and strategies (action items) found in the NC Forest Action Plan (FAP), will be used as the Forestry NPS Branch's five-year (2010-2015) work plan. This FAP is a comprehensive evaluation of the status and trends of all forestlands in North Carolina. Detailed descriptions of strategies to address the most pressing issues facing the state's forests are also included. The FAP was conducted throughout 2009 and 2010 by Forest Service personnel as part of a national effort led by the USDA-Forest Service to facilitate each state to conduct an assessment and develop corresponding strategies. The FAP can be found on the Forest Service's website at http://www.ncforestassessment.com/index.htm. This publication contains details on the NPS Branch's recurring, core projects related to BMP program delivery, as well as new initiatives that are funded by multiple federal grants.

One of the new services the Forestry NPS Program identified in the state's forest action plan is related to providing landowners with enhanced technical advice and assistance concerning the water resources that are located on their forestland. A forest/watershed management plan would be developed for the landowner that can spell out the status and conditions of the water features, as well as introduce the landowner to potential water-related ecosystem services markets that are uniquely available in North Carolina. This enhanced service to landowners is tentatively being referred to as "Forest Watershed Assistance Planning" (FWAP), and would offer services to both a traditional rural-based forest owner as well as explore innovative management measures for forestlands that are situated within an urban/suburban fringe landscape. This project's "Urban Component" was successfully grant-funded in 2011; and will be developed in 2013-2014. The NPS Branch staff anticipates a demand for this innovative service once available in the 2014-2015 timeframe.

Program Correlations:

The Forestry NPS Program and the items described in this Work Plan can be correlated to, or help to support activities identified within, the following documents (listed chronologically):

- *North Carolina's Forest Action Plan: 2010.* Goal 6 (and all associated Objectives and Strategies): "Manage, conserve, restore, and enhance forestlands important to current and future supplies of clean water for economic, social, and ecological uses."
- NC-DENR 2009-2013 Strategic Plan. August 2009.
- Final Report of the Southern Group of State Foresters Water Resources Committee Program Review and Technical Assistance Visit, December 2010.
- NC Coastal Habitat Protection Program (CHPP) Implementation Plan.
- USEPA *National Management Measures to Control Nonpoint Source Pollution from Forestry*: April 2005.
- NCFS Water Quality Action Plan: April 1998.

Outputs & Deliverables:

A) Complete 4rd cycle of BMP Implementation Survey and implement 5th cycle of survey:
   1. Distribute and present findings via outreach sessions to internal and external customers; and via online posting to NCFS's Web site.
   2. Develop a report describing possible revisions to the BMP survey and manual based upon the results of two previous surveys that were founded on the 2006 BMP Manual content.

3. Prepare a report for NCFS management that details the applications of BMP electronic survey capture to other forest management data acquisition activities.
4. Develop a protocol for conducting future BMP surveys on a recurring, ongoing basis.
5. Finalize forest operator-requested, site-specific BMP survey procedure, and implement.

B) Finalize close-out of Forestry BMP Effectiveness Monitoring / Paired Watershed Study:
1. Produce final project report and publish in a peer-reviewed journal.
2. Conduct outreach sessions.
3. Work with present land managers/stakeholders (NCDA&CS and NCSU) to identify ongoing monitoring/research opportunities if feasible. Seek funding as needed.
4. Report on the findings of all cumulative stream crossing study assessment. Provide recommendation related to possible revisions to state regulations and BMPs.

C) Forestry BMP Manual
1. Work with the Forestry Technical Advisory Committee (TAC) to finalize an outline for prospective revisions to the NC Forestry BMP Manual.
2. Begin undertaking Manual revisions, contingent upon concurrence from the TAC and NCFS management.

D) Bridgemat Loan/Education/Protection project:
1. Facilitate use of bridgemats on at least 40 sites per annum.
2. Conduct a minimum of 10 field inspections of NCFS-owned bridgemats.
3. Maintain bridgemat supplier list on NCFS's Web site for customer reference.
4. Produce an annual project status update report.
5. Deliver recommendations to sunset the bridgemat loan program to NCFS management.
6. Secure grant funding for a BMP Cost-Share Program for bridgemats and other environmental-friendly products for forest operators.

E) Continue Development of the Forest Preharvest Planning Web-based GIS tool (PHP/GIS):
1. Finalize tool and conduct Beta testing in preparation for going live to customers.
2. Conduct forest operator training sessions demonstrating the benefits of PHP/GIS.
3. Utilize marketing tools to proliferate and mainstream use of PHP/GIS by other forestry stakeholders.
4. Prepare demonstrations and outreach for other states who may wish to adapt and use the program in their state

F) Continue Monitoring and Managing Stream Restoration Projects:
1. Monitor completed restoration projects via on-site evaluations; at least once per annum for each restoration project (Purlear Creek; Hooker Falls/Little River; Lake Julia Outfall). Assure annual monitoring reports are prepared and submitted as needed.
2. Finalize plans to secure additional funding to restore a reach of the Linville River at Gill State Forest; conduct planning, engineering, and design of restoration as first phase.
3. Continue facilitation and oversight of water sampling and associated support of the Claridge Nursery stream restoration project with NCSU and other technical partners.
4. Participate and present restoration paper at 2014 NCSU Stream Restoration Conference.

5. Evaluate and advise NCFS management of stream & wetland restoration/enhancement opportunities at select properties managed by NCFS or NCDACS as warranted.

G) Training, Education, and Technical Assistance
1. Continue to coordinate NCFS's partnership with NCFA's ProLogger Program. Target 80 loggers trained over 12 months through the *Base* Course workshops.
2. Participate in public events that target forest owners or loggers, to provide outreach on forestry BMPs.
3. Continue tailgate BMP training for loggers. Expand delivery across western North Carolina, with project delivery assistance from Water Quality Foresters. Target 50 individuals trained.
4. Provide forestry BMP/NPS pollution prevention training/education per customer request.
5. Continue to provide forestry-related input and contribution to watershed activist associations, and specifically for DWQ's Basinwide Water Quality Management Plans consistent with the basin plan five-year revision schedule.
6. Assist with team-teaching of NCFS fire-fighting equipment operators and other personnel on BMPs and site rehabilitation after wildfire control operations.
7. Implement a protocol for routine monitoring and follow-up regarding the implementation of BMPs on NCFS-installed fire control lines.
8. Continue to provide technical assistance to NCFS and NCDACS facilities and internal field operations via 'WATERS' - Water Resource Assessment and Technical Response Support.
9. Work with the Forestry TAC and other subject matter experts to finalize criteria for a responsible party to restore/mitigate/repair a stream that has been impacted as a result of a forestry activity that was not in compliance with FPG's.

H) Outreach and Publications
1. As needed, reprint copies of the *NC Forestry BMP Manual to Protect Water Quality* and distribute to maintain adequate inventory.
2. Create new *Forestry Leaflets* as warranted by customer request.
3. Continue the production and delivery of Region/District BMP newsletters.
4. Continue as primary source for content delivery to the 'Water Quality' portion of NCFS public website.
5. Oversee development of four new 'Hot Topics' per annum related to forestry nonpoint source issues.
6. Maintain relevant content and current information on the 'Water Quality' portion of NCFS's public Web site.
7. Continue to monitor/report (quarterly) customer use of the Water Quality Web site using Google Analytics®.
8. Continue to use the *NCForestryNPS Mail List* to disseminate BMP and WQ news items.

I) Inter-Agency Cooperation

Continue serving as forestry and/or NCFS representative to inter-agency work groups affiliated with water quality and nonpoint source pollution, including:
1. Albemarle-Pamlico National Estuary Program (APNEP) Science & Technology Advisory Committee (STAC);

2. Coastal Habitat Protection Plan (CHPP) Implementation Committee;
3. DENR Watershed Restoration & Improvement Team (WRIT);
4. Forestry Advisory Council;
5. Forestry/FPG Technical Advisory Committee (TAC);
6. NC Nonpoint Source Workgroup;
7. Southern Group of State Foresters (SGSF) Water Resources Committee (WRC), GIS Task Force, and other related SGSF workgroups;
8. DENR/DWQ Science Advisory Board;
9. NC Agricultural Task Force;
10. DENR Eco-Flow Science Advisory Board.

J) Forest Watershed assistance, Planning, Monitoring and Research:

1. Continue providing Forest Watershed Assistance Plan (FWAP) service to landowners.
2. Cooperate with NCFS Urban & Community Forestry Program to implement watershed-based planning assistance to municipalities for urban/suburban forested watersheds, while incorporating urban forestry principles.
3. Continue to seek funding and partners for long term water quality protection, restoration, monitoring, and forestry-related NPS research and demonstration within the Beddingfield Creek watershed at Clemmons Educational State Forest on the Wake/Johnston county line, near Clayton.

K) Field Operation Support

1. Continue to support NCFS field operations as requested by, or in support of, the Forest Management Branch's Water Quality & Wetlands Staff Forester.
2. Continue seeking alternative funding sources to establish a Water Quality Forester for NCFS's Fayetteville District.
3. Continue seeking funds for installing BMP demonstrations and implementing BMP improvement work on NCFS State Forest facilities.

L) Incident Management

Continue serving in functional capacity for incident management and emergency preparation, training, and response; as required by NCFS policy.

M) Reporting

Provide 319-Grant quarterly reporting and invoicing to NCDWQ. Provide Final Report on or before expiration of grant's supporting contract.

Project Milestones

Project Milestone Schedule		
Time Period/Date	Activities (List specific outputs or activities that will be achieved during each quarter)	Anticipated $ / % of 319 Grant Funds
First Quarter Oct-Dec	3 FTEs21PTTEs Salary/Fringe; Branch Projects and Operations; Quarterly Report and Invoice	$76,226 / 25%*
Second Quarter Jan-Mar	3 FTEs/2PTTEs Salary/Fringe; Branch Projects and Operations; Quarterly Report and Invoice	$76,226 / 25%*
Third Quarter Apr-June	3 FTEs/2PTTEs Salary/Fringe; Branch Projects and Operations; Quarterly Report and Invoice	$76,226/ 25%*
Fourth Quarter July-Sept	3 FTEs/2PTTEs Salary/Fringe; Branch Projects and Operations; Quarterly Report and Invoice and Final Report	$76,226 / 25%*

*These totals are subject to change due to the nature of NCFS Forestry Base Program. The quarterly invoices submitted will reflect Forestry NPS Branch expenses that fluctuate throughout the year primarily due to project and travel dynamics and in response to state government directives on expenditures and cost containment.

State & Other Match Funding:

State match will be provided by the N.C. Department of Agriculture & Consumer Services in the amount of $203,270 in the form of salary/fringe for Forest Service WQ Forester staff (and Service Foresters, County Rangers, and Technicians as needed) and other direct state-funded costs related to evaluating compliance with the *Forest Practices Guidelines Related to Water Quality*. Additional federal grants and state matching funds will be pursued to support the Forestry NPS Program mission, including staff salary/fringe and project funding. The requested 319 Grant 'Base Funds' support the Forest Hydrologist, BMP Staff Forester, NPS Senior Specialist, and part-time administrative positions' salary/fringe, and the Forestry NPS Branch's day-to-day operational costs.

Budget:

Activity	Description	Amount
Salary (9-WQFs)**	Match Funds	$168,713
Fringe (9-WQFs)**	Match Funds	$34,557
Total		**$203,270**

**Additional NCFS staff, including Service Foresters, County Rangers, and Forest Technicians' hours committed to water quality-related activities are used as match to this Federal Grant. The NCFS employees' salary and fringe are tracked using the Beacon Timekeeping/Payroll software platform.

Federal request:

Activity	Description	Amount
Salary	3 FTEs/2PTTEs	$196,527
Fringe	3 FTEs/2PTTEs	$ 58,197
Travel, Per Diem, Conference Fees, Project Work, & Special Projects	3 FTEs/2PTTEs Project fieldwork and other travel (monitoring and surveys), water quality/NPS meetings, presentations, and workshops.	$15,000
Staff Professional Development	3 FTEs/2PTTEs - Training and education including but not limited to professional development workshops and University classroom and online coursework related to FM/NPS/WQ/GIS topics.	$5,000
Supplies and Materials	3 FTEs/2PTTEs – Uniforms, PPE, new publications & reprints, exhibits and graphics, educational supplies, office supplies, field BMP supplies and materials, and other project expenses (such as BMP demonstration, maintenance and improvement materials for ESF/SF locations)	$8,528
Equipment (Field & Office)	3 FTEs/2PTTEs – PC software/hardware and other accessories; WQ instruments; monitoring equipment	$2,000
Indirect	10% of Salary	$19,652
Total		**$304,904*** **

***Amount of federal funds requested is consistent with NCGA HB119 which became Session Law 2011-394, effective July 1, 2011, and assumes no additional water-quality grant funds from other sources have been awarded. Actual amount of USEPA FY2013 319-Grant funds received by NC and allocation of these funds between Base and Incremental will determine final FY13 budget allocation amount to NCFS Forestry NPS Program; along with any additional grants obtained that are used to co-share the total operating costs (i.e., staff salary/fringe, projects, and day-to-day operational costs) of the Forestry NPS Program.

Project period: October 1, 2012 to September 30, 2013.

Activity NCB-2: Agricultural NPS Pollution Control (DSWC)

a. Overview

Agriculture is the leading industry in North Carolina. According to the North Carolina Nonpoint Source Assessment Report, agriculture is the largest source of stream-use impacts in the state. Of the 30% of stream miles which are impacted negatively, agriculture is suspected of impacting approximately 65%. In addition, agriculture is suspected of being the primary source (60% of impacted acres) of NPS pollution in estuarine areas. These estimated percentages, determined by the Division of Water Quality (DWQ), were based upon inputs from many other agencies, reports, and land use within the impacted watersheds.

North Carolina recognized early the impact of agriculture on water quality and decided that action must be taken. The approach chosen for addressing agriculture's contribution to NPS pollution has been and will continue to be a combination of financial, technical, educational, research, and regulatory programs. In 1984 a financial incentive program began in nutrient-sensitive waters known as the Agriculture Cost Share Program (ACSP) for NPS Pollution Control. The ACSP has continued to expand and is now active in all 100 counties in the state. Approximately six million dollars is appropriated annually to share costs of implementing best management practices with farmers and to provide technical assistance for practice design and installation.

In 2008 a new program began to address the water quality problems associated with stormwater runoff, the Community Conservation Assistance Program (CCAP). This program is modeled after the successful ACSP program and is designed to improve water quality through the voluntary installation of various best management practices (BMPs) on developed, non-agricultural lands. Local soil and water conservation districts deliver this program by providing educational, technical and financial assistance. CCAP BMPs include: backyard rain gardens, cisterns, permeable pavement, riparian buffers, stormwater wetlands, and other practices. Eligible landowners, including homeowners, businesses, schools, parks, churches, and others, may be reimbursed up to 75 percent of the cost of installing these retrofit BMPs.

Since 1997, all ACSP and CCAP contracts have included information on nitrogen and phosphorus reduction benefits and soil savings benefits for each contract. This information allows the Division to account for cumulative benefits of implemented conservation practices by hydrologic unit, river basin, or watershed of special concern.

This position develops and coordinates an "Impaired and Impacted Stream Survey: (IISS). The IISS is provided to each district as a means of identifying resources (financial and personnel) that are necessary to help alleviate water quality concerns on streams listed on the 303(d) list, as well as streams that are not listed on the 303(d) list but have locally recognized impacts from agriculture. In FY2011, 37 districts participated in the IISS, receiving approximately 12% ($500,000) of the total NC Agriculture Cost Share Program allocation.

Additionally, as DWQ or other agencies and entities request information from the districts on areas of special concern, the Non-Point Source Coordinator serves as the liaison between the Division, the Districts, and the interested parties. Such requests include, but are not limited to sub-watershed

scale special requests on agricultural activities, threatened habitat areas for rare species, and reports on agricultural activities in areas with known nutrient loading issues.

b. Project Milestones

19. Project Milestone Schedule		
Time Period/Date	Activities (List specific outputs or activities that will be achieved during each quarter)	Anticipated % of Requested Funding Spent
First Quarter Oct – Dec	1. Provide Quarterly Reports to DWQ and CWMTF on existing grants	25% $26,171
Second Quarter Jan – Mar	1. Provide Quarterly Reports to DWQ and CWMTF on existing grants 2. Submit to the districts the Impaired and Impacted Stream Survey (IISS).	25% $26,172
Third Quarter Apr – June	1. Provide Quarterly Reports to DWQ and CWMTF on existing grants. 2. Compile district IISS requests. 3. Review and provide comment for 319 grant applications as a member of the NPS Workgroup.	25% $26,172
Fourth Quarter July – Sept	1. Provide Quarterly Reports to DWQ and CWMTF on existing grants 2. Present an allocation request to the Soil and Water Conservation Commission for IISS funding to participating districts. 3. Participate in 319 grant interviews as a member of the NPS Workgroup	25% $26,172

c. Outputs

1. Falls, Neuse and Tar-Pamlico Nutrient Sensitive Waters Strategy Implementation
    - Work with LACs to assist in their timely completion of rule requirements. Work with LACs not meeting goals. Run NLEW software, review county data, and develop supporting information for reporting requirements. Prepare the Annual Progress Reports for the Falls, Neuse and Tar-Pamlico Agriculture Rules.

- Grant coordination and administration
    - Provide coordination and administration of the ongoing/upcoming DSWC and SWCDs EPA 319 and CWMTF grant projects.

- Target impaired and impacted streams

- Develop the Impaired and Impacted Stream Survey to all 100 districts. Use surveys to request an Agriculture Cost Share Program allocation for these waters and purposes. Track the number of districts participating and the streams identified in the survey. Provide the information to DWQ staff.
- Ensure that all 100 districts include DWQ Basinwide Planning information in their annual ACSP and CCAP strategy plans

- NPS Workgroup
  Serve on the NPS Workgroup and provide project rankings to select Section 319 competitive projects for funding.

d. State Match

State match will be provided by the Department of Environment and Natural Resources as direct match in the form of salaries and fringe benefits or other direct costs associated with implementing the ACSP for a total of **$69,791.**

e. Federal Request:

Activity	Amount	Description
Salary and Benefits	$64,131	Salary, insurance, and benefits to support the NPS Planning Coordinator (1 FTE)
Travel	$6,313	Funds for vehicle travel for coordinator to LAC meetings, annual meetings, training, Workshops
Equipment	$20,000	Computer and/or other technology equipment, office equipment as needed to meet outputs.
Supplies	$7,243	General office supplies including paper, copies, supplies for presentations, printer cartridges, file folders, etc.
Education	$5,000	Registration for workshops, training, and continuing education.
Other	$2,000	Miscellaneous expenses to support position's duties
Total	**$104,687**	

f. Project Period: October 1, 2012 to September 30, 2013

Activity NCB-3. Erosion and Sedimentation Control (DEMLR)

a. Overview

The State Sedimentation Pollution Control Act of 1973 requires an erosion and sedimentation control plan for any land-disturbing activity if more than one acre is to be disturbed. Agriculture is exempt from this requirement and forestry has a limited exemption. The Department of Environment and Natural Resources administers this mandatory program under the guidance of the Sedimentation Control Commission. The Department and Commission are charged with enforcement of the Act and education of the regulated community and general public about erosion and sedimentation control. Funding from the FY13 319(h) grant provides continued support in the form of one full-time staff person, the Sediment Education Specialist, for the education and training program mandated by the Act.

One of the fundamental responsibilities of this position is to provide training related to the state sedimentation and erosion control program and design materials for professional engineers, architects, surveyors, contractors and regulated community. Technical assistance is offered through the Sedimentation and Erosion Control Planning and Design Manual, the companion Field Manual, and five annual workshops for design professionals and local government. Another objective of the program is to provide education on erosion and sedimentation control to the general public. Technical expertise has been and will continue to be provided to education professionals to help implement sedimentation pollution awareness in public schools and colleges. Through presentations and distribution of teaching aids, school teachers are equipped to teach students about soil erosion and sedimentation control.

The Division of Energy, Mineral, and Land Resources, Land Quality Section and the Sedimentation Control Commission have reserved funds for educational materials. However, these funds cannot be used for staff positions. Therefore, Section 319(h) funding is needed to support the Sediment Education Specialist to administer the education program. This position is located in the Division of Energy, Mineral, and Land Resources, Land Quality Section.

The primary function of this position is education and outreach. Measurable results include the number of people reached through workshops, conferences, and newsletters, as well as the number of information requests filled. In 2010-11, four Erosion and Sedimentation Control Seminars were conducted for design professionals, with a total of 268 participants. The annual North Carolina Science Teacher Association Conference was attended in an effort to distribute sediment education materials and make contacts with teachers from across the state. An annual workshop was conducted for the delegated local erosion and sediment control programs to train local government staff in erosion and sediment control related issues, with a total of 107 participants. Two seminars have been held with homebuilder groups to announce the Self-Inspection/Self-Monitoring Program requirements, which were attended by 25 representatives from local developers and contractors. Two similar training sessions were conducted for the Department of Defense projects at Fort Bragg, which were attended by 30 representatives from the Corps of Engineers and 20 associated contractors. Efforts are being taken to evaluate the education program and ensure training sessions on new rules are made available to interested parties in the most cost-effective manner possible. Web conference sessions have been held to

provide instruction on recent Land Quality regulations. The web conference was done in cooperation with the Professional Engineers Association of North Carolina and was made available to all members. This was done in an effort to reach a wider audience seeking professional development opportunities. The electronic ***Sediments*** newsletter is distributed among a listerve of approximately 500 recipients, and is also made available as an online news publication.

The Sediment Education Specialist receives and responds to inquiries from the public and government agencies. Guidance is provided to understand the regulations related to erosion and sediment control. The ability to provide technical assistance, during reorganization of agencies and 52 Local Programs, is critical to maintaining sedimentation pollution awareness. The Sediment Education Specialist is also responsible for the revisions of the NC Erosion & Sediment Control Planning and Design Manual, which give guidelines on the best measures and design practices for erosion and sediment control. New rules to project Falls Lake as a drinking water supply for the Durham-Raleigh area will require additional training for the design and development community on more stringent design standards.

The sedimentation education specialist administered a contract for construction of a demonstration site at the Mountain Horticultural Crops Research and Extension Center to be operated by the North Carolina Cooperative Extension Service in Mills River, near Asheville. The site serves the mountain region of North Carolina where participants can experience hands-on installation and demonstration of erosion, sediment, and turbidity control devices. The release of sediment from construction sites remains an issue, even with guidelines set by state and federal regulations requiring construction activities to minimize soil erosion and install sediment controls. Education is needed to train about the proper design, installation, and maintenance of Best Management Practices (BMPs) and other water quality improvement techniques. Sediment is the largest water pollutant, by volume, in the state of NC. Through education and training, this position aids in the control of erosion and sedimentation, thus positively impacting water quality throughout the state.

b. Project Milestones

This activity supports educational components in the FY2013 Action Plan for Construction.

c. Outputs

Education/Workshops

1. Support 5 workshops/seminars for engineers, land surveyors, landscape architects, contractors, regulatory agencies, etc.
2. Conduct 4-8 visits to schools for classroom lectures, field studies, career days or science fairs (grades K - 12 and adult). Present Enviroscape model for environmental education.
3. Exhibit and educate at 8 events at workshops and conferences. Distribute brochures and explore different audiences. Attend/exhibit at least two teacher workshops/seminars/conferences.
4. Assist in New Employee Training, when scheduled, and develop power point presentations.

Publications/Website/Information Requests

5. Distribute the **North Carolina Erosion and Sedimentation Control Planning and Design Manual,** the **North Carolina Erosion and Sedimentation Control Field Manual,** the **Erosion and Sedimentation Control "Inspector's Guide"** and **Video Modules.**
6. Revise the **North Carolina Erosion and Sedimentation Control Planning and Design Manual, Field Manual, and Inspector's Guide** as approved by the Technical Advisory Committee of the NC Sedimentation Control Commission.
7. Distribute the Teacher's Guides and the **Erosion Patrol Kits** for third grade classes as requested.
8. Coordinate production of semi-annual newsletter, **"Sediments,"** dealing with erosion and sedimentation control.
9. Oversee the website for the Erosion and Sedimentation Control Program, Land Quality Section.
10. Fulfill delegated Local Programs, private and public information requests via email, mail, and phone. Create and disseminate Designer, Planner, Inspector, Teacher, and Student Sediment Info Packets.
11. Revise and edit erosion and sedimentation control modules, manuals, educational brochures, and flyers to reflect current policies. Design promotional materials. Create displays for exhibits at conferences.

Technical Oversight/Assistance

12. Keep abreast of research on effectiveness of erosion and sediment control measures
13. Peer review of new information and technology updates from the erosion and sediment control research station at NCSU
14. Coordinate with other agencies such as NCDOT, S&W, CES, and DWQ to pursue development of educational programs. Support interagency relations.
15. Receive and respond to inquiries from the public and government agencies. Comment on DWQ River Basin-wide Planning efforts concerning construction activities and evaluate recommendations with respect to SPCA.
16. Receive complaints concerning violations of the SPCA and enter into the IBEAM database.

Annual Award/Contest Programs

17. Conduct an annual awards program to recognize outstanding delegated erosion and sedimentation control programs. Evaluate nominations, select winners, and invite guest speakers.

Sedimentation Control Commission/Sedimentation Education Committee/Technical Advisory Committee

18. Serve as staff and report to Sedimentation Control Commission on contract grants, proposals, and education program.
19. Serve as staff and report to Sedimentation Education Committee. Organize four meetings per year to evaluate Sedimentation Education Projects and Education Program. Maintain membership, monitor attendance, record minutes, set agendas, write proposals, distribute meeting materials, and deliver recommendation status reports.

20. Serve as staff and report to Technical Advisory Committee. Advise on agenda, edit monthly meeting minutes, and review revised technical material.

Education Program Management and Database Maintenance

21. Record public information requests and education projects outreach on database. Prepare reports on Sedimentation Education Program to NC Office of Environmental Education and EPA 319 NPS Program.

Contract Administration

22. Write and revise grant proposal applications, mail RFP's, and suggest proposal ideas.
23. Prepare proposals for contract administration. Provide forms for budgeting office and obtain signed contracts by DENR and grantee.
24. Manage education project contracts and records. Gather invoices and evaluate according to proposed contract budgets.

NPS 319 Program Support

25. Support 319 activities as requested. Participate in Nonpoint Source team interaction concerning erosion and sedimentation control. Prepare quarterly reports, invoices, annual workplans, MOA's, and NPS Management Plan reviews.
26. Read and evaluate 319 proposals yearly for federal funding. Rank proposals and participate as member of NPS Unit Review Team.

Professional Development

27. Attend meetings that enhance knowledge and support of erosion and sedimentation control technologies and programs.
28. Attend training opportunities that enhance engineering and/or educational skills.

Public Information/Emergency Response

29. Disaster Response Center Situation Report Coordinator duties. Combine DLR emergency fact sheets for public media distribution. Read news articles for LQS significance.

d. State Match

State match will be provided in the amount of $111,600 by the Department of Environment and Natural Resources through funds awarded for erosion and sedimentation control education projects.

Activity	Description	Amount
Contracts	Workshops/Newsletter FY11-12	$111,600
Total		$111,600

e. Federal 319 Budget: Environmental Engineer I, Salary Grade 74

Activity	Description	Amount
Salary	1 FTE (Environmental Engineer I)	$50,000
Fringe		13,000
Total		$63,000

f. Project Period: October 1, 2012 to September 30, 2013

Activity NCB-4: Onsite Wastewater Treatment and Disposal (Onsite Water Protection Branch, Division of Public Health, Department of Health & Human Services)

a. Overview

Onsite wastewater systems are sometimes referred to as 'septic systems.' A conventional septic system consists of a septic tank, a distribution box or header pipe and a series of subsurface effluent dispersal lines consisting of perforated pipes installed in a bed of gravel. North Carolina also has regulatory provisions for permitting modified systems that include alternative trench media, aerobic treatment components and disinfection methods. Further, the practice of using 'clustered' systems that treat wastewater from multiple sources has prompted the use of the term 'decentralized systems.'

Effluent dispersed through septic systems is a potential non-point source (NPS) of pollution because of the possibility for constituents to reach ground and surface water. Contamination is most likely to occur from systems that are improperly managed. That is, when issues related to siting, design, installation, operation and maintenance are not adequately addressed, contamination may occur.

All wastewater collection and treatment systems in North Carolina that use subsurface dispersal are under the jurisdiction of the Commission for Public Health (CPH) of the Department of Health and Human Services. The CPH establishes the rules for on-site wastewater systems, which are administered by the Environmental Health Section Onsite Water Protection Branch (OWPB). There are 85 Local Health Departments (LHD) serving 100 counties with approximately 780 local environmental health specialists (EHS) authorized as agents of the state to enforce the laws and rules for the design, siting, permitting, compliance and repair of subsurface onsite wastewater treatment systems. Local boards of health have typically adopted the state rules by reference. Some local boards have chosen to append those rules with even more stringent laws and local criteria. These amendments must be approved by the state. Currently, only two counties in the state (Orange and Wake) operate under local rules.

In accordance with Article 11, Chapter 130A of the NC General Statutes, [(GS 130A-335(e) and (f))], the rules of the CPH and those of any local board of health shall address at least the following: wastewater characteristics; design unit; design capacity; design volume; criteria for the design, installation, operation, maintenance, and performance of wastewater collection, treatment, and disposal systems; soil morphology and drainage; topography and landscape position; depth to seasonally high water table, rock, and water impeding formations; proximity to water supply wells, shellfish waters, estuaries, marshes, wetlands, areas subject to frequent flooding, streams, lakes, swamps, and other bodies of surface or groundwater; density of wastewater collection, treatment, and disposal systems in a geographical area; requirements for issuance, suspension, and revocation of permits; and other factors which affect the effective operation in the performance of sanitary sewage collection treatment and disposal systems. The rules also must provide construction requirements, standards for operation, and ownership requirements for each classification of sanitary systems of sewage collection, treatment, and disposal in order to prevent, as far as reasonably possible, any contamination of the land, groundwater, and surface waters.

The permitting procedure for these systems includes three phases with accompanying documentation: Siting (Improvement Permit), Design/Construction (Construction Authorization) and Operations (Operation Permit). In 2010 statewide activities included 28,007 site evaluations, and issuance of 21,531 construction authorizations, 16,658 improvement permits and 4,311 repair permits. A total of 19,109 systems were commissioned with operation permits. Requests for 1,154 construction authorizations and improvement permits were denied. Complaint investigations numbered 6,706 and 110 legal remedies were pursued.

The OWPB provides technical support, quality assurance, and technology transfer through a professional staff of soil scientists, environmental engineers, program auditors and the NPS coordinator. The staff also conducts workshops, reviews technology and participates in classes for citizens, state and local governments, practitioners and other professionals throughout the state. The staff conducts Centralized Intern Training (CIT) which leads to authorization of Environmental Health Specialists that implement the Laws and Rules on the local level. The NPS Coordinator serves as a liaison among the OWPB professionals, local health department personnel, other state agencies and the general public.

The NPS Coordinator position in the OWPB was established through FY96 Section 319(h) funding, and has continued to date. The NPS Coordinator implements the activities of the on-site program as part of the basinwide water quality management plans as described in the NC NPS Pollution Management Program Goals (2004 Update). This FY12 Workplan describes activities to be conducted during the next contract period in direct support of NPS Pollution Management Program Goals. In conjunction with other OWPB staff members, the Coordinator *specifically* engages in 8 of 9 Actions directed toward achievement of Objective 1 *(Prevent surface and ground water quality degradation from onsite wastewater systems)* under Category G (*Onsite Wastewater*). The NPS Coordinator also directly or indirectly supports Program Goals 2 (Restoration) and 3 (Education) through improved performance as a result of effective implementation of BMPs; provision of data for use in modeling activities for development of TMDLs; identification and repair of malfunctioning systems, and; coordination of educational activities to increase prevention of NPS pollution and aid in restoration of ground and surface waters. The budget for this activity is $60,290 covered by Section 319(h) and $40,213 in nonfederal match.

b. Project Milestones

Project Milestone Schedule		
Time Period and Date	Activities (List specific outputs or activities that will be achieved during each quarter)	Anticipated % of Requested Funding Spent
First Quarter	Facilitate, coordinate and/or serve as an instructor for lectures, seminars, workshops and conferences Initiate, produce, update and/or distribute printed materials on system management for the general public	

	Develop and/or disseminate printed and electronic training materials to support professional licensing and certification of industry practitioners Assess performance of onsite system collection, treatment and dispersal technologies for NPS pollution control Collect, develop, post and update web-based resources for the statewide and national audience Collaborate with federal and state agencies to conduct research on pertinent topics Review current guidance documents and proposed laws and rules for fiscal impact, scientific validity, clarity, and consistency Consult on and provide data for basinwide planning Serve as DPH representative at stakeholder meetings and promote implementation of BMP Provide consultation regarding onsite systems to out-of-state entities Prepare and submit quarterly report	20%
Second Quarter	Participate in NPS conferences in NC and nationally as requested Participate in NPS Workgroup activities: set RFP priorities Facilitate, coordinate and/or serve as an instructor for lectures, seminars, workshops and conferences Initiate, produce, update and/or distribute printed materials on system management for the general public Develop and/or disseminate printed and electronic training materials to support professional licensing and certification of industry practitioners Assess performance of onsite system collection, treatment and dispersal technologies for NPS pollution control Collect, develop, post and update web-based resources for the statewide and national audience Solicit grant funding for research on decentralized wastewater and collaborate with federal/state agencies on pertinent research Review current guidance documents and proposed laws and rules for scientific validity, clarity, consistency and fiscal impact Consult on and provide data for basinwide planning Serve as DPH representative at stakeholder meetings and promote implementation of BMP Provide consultation regarding onsite systems to out-of-state entities Serve on boards and committees of state and national associations Prepare and submit quarterly report	30%
Third Quarter	Participate in NPS conferences in NC and nationally as requested Participate in NPS Workgroup activities: review, interview, and evaluate annual NPS 319(h) grant proposals. Facilitate, coordinate and/or serve as an instructor for lectures, seminars, workshops and conferences Initiate, produce, update and/or distribute printed materials on system	30%

	management for the general public Develop and/or disseminate printed and electronic training materials to support professional licensing and certification of industry practitioners Assess performance of onsite system collection, treatment and dispersal technologies for NPS pollution control Collect, develop, post and update web-based resources for the statewide and national audience Solicit grant funding for research on decentralized wastewater and collaborate with federal/state agencies on pertinent research Review current guidance documents and proposed laws and rules for scientific validity, clarity, consistency and fiscal impact Consult on and provide data for basinwide planning Review EPA 319(h) and CWMTF research proposals related to onsite wastewater Serve as DPH representative at stakeholder meetings and promote implementation of BMP Provide consultation regarding onsite systems to out-of-state entities Serve on boards and committees of state and national associations Prepare and submit quarterly report	
Fourth Quarter	Participate in NPS conferences in NC and nationally as requested Facilitate, coordinate and/or serve as an instructor for lectures, seminars, workshops and conferences Initiate, produce, update and/or distribute printed materials on system management for the general public Develop and/or disseminate printed and electronic training materials to support professional licensing and certification of industry practitioners Assess performance of onsite system collection, treatment and dispersal technologies for NPS pollution control Collect, develop, post and update web-based resources for the statewide and national audience Solicit grant funding for research on decentralized wastewater and collaborate with federal/state agencies on pertinent research Review current guidance documents and proposed laws and rules for scientific validity, clarity, consistency and fiscal impact Consult on and provide data for basinwide planning Serve as DPH representative at stakeholder meetings and promote implementation of BMP Provide consultation regarding onsite systems to out-of-state entities Serve on boards and committees of state and national associations Prepare and submit quarterly and annual reports	20%

c. Project Outputs

I. NPS ACTIVITIES FOR THE 319 PROGRAM
   A. Quarterly, annual and final reports; workplans for base position
   B. Participate in NPS conferences in NC and nationally.
   C. Participate in NPS Workgroup activities: set RFP priorities, review, interview, and evaluate annual NPS 319(h) grant proposals.

II. EDUCATIONAL ACTIVITIES AND RESOURCES
   A. Facilitate, coordinate and/or serve as an instructor for lectures, seminars, workshops and conferences statewide and nationally: attend planning meetings, develop and present materials, provide primary or supplemental resources for federal, state and county state agencies, academic institutions and private entities.
   B. Initiate, produce, update and/or distribute printed materials (fact sheets, extension publications, training and guidance documents) on system management for the general public
   C. Develop and/or disseminate printed and electronic training materials for industry practitioners to improve all aspects of system management (siting, design, installation, operation and maintenance) and support professional licensing and certification
   D. Write and/or update literature reviews and annotated bibliographies on decentralized wastewater topics
   E. Collect, develop, post and update web-based resources for the statewide and national audience (http://www.deh.enr.state.nc.us/osww_new//index.htm and http://www.onsiteconsortium.org., respectively)

III. TECHNOLOGY TRANSFER AND ASSISTANCE
   A. Assess performance of collection, treatment and dispersal technologies for NPS pollution control through participation in state approval processes
   B. Review performance of conventional, alternative and experimental systems through field investigations.
   C. Use state-of-the-art electronic tools (GIS, WET, DRAINMOD, etc.) to track pollutants and facilitate review processes as appropriate
   D. Serve as a liaison among the public, private and academic sectors.

IV. RESEARCH
   A. Solicit grant funding for research on decentralized wastewater characteristics, treatment processes, technology performance, etc.
   B. Collaborate with federal and state agencies to conduct research (experimental design, field work, report preparation and dissemination of results) on pertinent topics

V. STAKEHOLDER PROCESSES
   A. Review current guidance documents and proposed laws and rules for fiscal impact, scientific validity, clarity, and consistency
   B. Consult on and provide data for basinwide planning through: attendance at meetings, provision of information on potential pollutant contributions from onsite systems and review of NC TMDLs/nutrient management strategies in accordance with the reporting schedule set by DWQ
   C. Review EPA 319(h) and CWMTF research proposals related to onsite wastewater

D. Serve as DPH representative at stakeholder meetings: provide technical guidance regarding onsite systems, assist local governments in achieving mandated nutrient reductions and promote implementation of best management practices (BMP)

E. Serve on boards and committees of state and national associations that advocate responsible management of onsite wastewater treatment and dispersal systems

F. Provide consultation regarding onsite systems to out-of-state entities as requested

d. State Match

This activity will be funded by the state Department of Health and Human Services in the amount of $40,213 which will serve as direct match for the overall Section 319 (h) grant. The match will be provided in the form of salaries and fringe benefits for central and regional office staff implementing the state on-site wastewater disposal program.

Activity	Description	Amount
Salary		$30,561
Fringe		$9,651
Total		$40,213

e. 319 Budget

Budgeted amount supports salary and fringe for the NPS Specialist position for activities including targeting BMPs, providing technology transfer of innovative on-site wastewater systems, and the production and distribution of educational information and materials.

Activity	Description	Amount
Salary	1FTE	$45,000
Fringe		$15,290
Total		**$60,290**

f. Project period

October 1, 2012 through September 30, 2013

NON-COMPETITIVE INCREMENTAL

NCI-1. Nutrient Framework in Prioritized Watersheds

a. Overview

North Carolina is proud of the work done so far to improve nutrient-impaired waters, but continued efforts are needed to fully restore these watersheds. Sustained implementation and assessment work is needed in these large and complex watersheds in order to effectively implement the state's nutrient rules in prioritized watersheds and for restoration to be realized. Three and one-half FTE positions enhance North Carolina's ability to implement our nutrient strategies and overall NPS management program, significantly contributing toward fulfilling the "recommended elements of a state framework for managing nitrogen and phosphorus pollution," (Stoner memo, March 2011) particularly element #6 (Accountability and verification measures). Specifically, the water quality assessment activities and data collected by these positions assists the Division of Water Quality in assessing the progress made in implementing and maintaining management activities and achieving load reductions goals for the watersheds in which they work.

All of these staff also have the capability and will seek opportunities to support competitive Watershed Projects awarded in the FY2013 cycle, which will increase the capacity of those projects to achieve and document measurable results. A more detailed description of the activities conducted by the 3.5 FTEs follows.

NPS Supervisor (1/2 FTE)
The position supervises the NPS Planning Unit, which includes the 319 Grant program and nutrient strategy planning, rule-making, and implementation. The position is heavily engaged in developing nutrient management strategies for large watersheds, drafting rules (which typically requires conducting stakeholder processes, preparing fiscal notes and presenting rules at hearing and preparing a hearing officer report), and overseeing implementation of established rules such as those for the Tar-Pamlico basin, Neuse basin and Jordan Reservoir watershed. Implementation can also include carrying out additional rulemaking to amend or add to existing rules as implementation experience dictates the need for refinements, revisions, and gap-closing.

This position provides policy, process & technical guidance to the staff to assist them with successfully carrying out their responsibilities and working towards meeting the Division's goals. Some of the activities involved with this responsibility include, but are not limited to: ensuring DWQ staff addresses requirements of any session law that modified the Environmental Management Commission's (EMC) nutrient rules; supporting preparation of basinwide plans, including development and implementation of action plans, that encompass watersheds subject to nutrient management strategies; maintain and update web pages; coordinate updating and implementation of Tar-Pamlico basin Phased Agreements; coordinating ag annual nutrient reduction reports and presentations to the EMC; engage in basinwide oversight committee (BOC)

meetings; address ag implementation issues; troubleshoot the Tar-Pamlico local stormwater programs; give nutrient strategy and trading talks as needed.

Watershed Restoration Coordination (3 FTEs)
The focus of these three positions for the foreseeable future is to coordinate implementation of the recently adopted Falls Lake and Jordan Lake Nutrient Strategies in addition to the ongoing implementation of the Neuse and Tar-Pamlico River Basin Nutrient Strategies. Each strategy is a set of rules that implements North Carolina session law or an approved TMDL for nitrogen and/or phosphorus reduction in order to restore the waterbody through an enforceable management strategy that has been adopted by the Environmental Management Commission and approved by the NC General Assembly.

Each Nutrient Strategy is a comprehensive set of rules designed to address excess nutrients inputs into the respective waterbody that have resulted in overproduction of algae and other eutrophication-related water quality problems. Nutrient sources addressed by the rules include agriculture, fertilizer application, wastewater discharges, and stormwater runoff from new development. The Falls and Jordan Lake strategies have the added requirement of addressing stormwater runoff from existing developed lands. In addition, rules are included that require protection of vegetated riparian buffers across all land uses. Local governments are required to reduce the discharge of nutrients from wastewater treatment plants and implement programs to address nutrient pollution from both existing and new development. The existing development requirements set precedent in North Carolina and are necessitated by the significant nutrient contributions from developed lands in this watershed. Also new is a separate trading rule that would facilitate use of the most cost-effective management options to meet the goals.

These positions oversee the implementation of the Neuse and Tar-Pamlico management strategies and led the strategy development, collaborative stakeholder, and formal rulemaking processes for both Falls and Jordan Lake. Over the next several years, these positions will be responsible for the following activities to continue implementing the rules in all four watersheds. The positions will collaborate with other Division staff, local governments, wastewater dischargers, agricultural interests and other interested parties to:

- Apply scientific knowledge related to nonpoint source pollution, its measurement and control, along with knowledge of state and federal statutes and rule frameworks to evaluate management options, develop regulations, establish compliance accounting mechanisms, and track and evaluate watershed nutrient reduction progress;
- Apply policy, strategic, and technical knowledge to produce recommendations for Basin Planners on management projects and initiatives for restoration and protection of specific waters of interest as part of their development of individual Basinwide Water Quality Plans;
- Produce and disseminate affected parties notifications, outreach information and guidance of various types, including regular updates to the strategy web pages;
- Develop model programs, accounting tools, and loading assignments;

- Review proposed programs required by New Development Stormwater, Agriculture, Existing Development Stormwater, and State/Federal rules and obtain changes to ensure that they meet rule criteria;
- Obtain Environmental Management Commission approval for implementation products – model programs and ordinances, accounting tools, and proposed programs - required under various rules;
- Conduct committee meeting processes required by Existing Development and Agriculture rules;
- Develop and provide implementation reports to the Environmental Management Commission, the Department, the Environmental Review Commission of the General Assembly, and others as needed under the rules;
- Develop rule interpretations to address issues raised by affected parties, draft and obtain Division approval for interpretive memoranda and other interpretive guidance;
- Amend rules as dictated to incorporate session law-mandated changes;
- Develop a comprehensive watershed wide nutrient trading framework for cost-effective trading between nonpoint sources and evaluate and make policy recommendations on nutrient reduction credit calculation methods and assignments to be used.
- Make strategy presentations to various audiences;
- Evaluate use support and water quality trend data, source accounting information and characterization studies, and review strategy design to determine adaptive management needs;
- Provide policy, strategic and technical input to the NPS Program and Workgroup regarding the nature and relative importance of nonpoint sources, available management tools and approaches, research needs;
- Develop or contribute to development of other state rules to further implementation of strategies as needed, e.g. nutrient offset and trading rules, and rules to prevent nutrient-enriched waters from exceeding standards through proactive nutrient control requirements.

b. Milestones Supported

This activity will support Action 3 of Objective 2 for Goal 1 (Protection), Action 2 of Objective 5 for Goal 2 (Voluntary Watershed Restoration), and all Actions within Objectives 1-4 for Goal 2 (Regulatory Watershed Restoration) for the NC NPS Management Program 5-Year Action Plan.

c. Output

1. Assist other NPS Planning Unit staff to carry out a rules amendment process for certain rules as required by session law, for approval by the Environmental Management Commission in advance of the 2013 legislative session. Also, update website and field information requests.
2. Agriculture Rules -Continue to participate on Watershed Oversight Committees and Basin Oversight Committees that implements these rules in each watershed.

3. New Development Rules–Assist local adoption and implementation of approved programs. Review annual reports tracking implementation progress. Complete and obtain approval for interpretive guidance on the use of banks for partial offsite offset.
4. Existing Development Rules– Staff the session law-mandated Nutrient Scientific Advisory Board (NSAB). Oversee the development of watershed modeling that will estimate baseline loads for local governments and allow development of load reduction assignments in the Jordan watershed. Work with the SAB to identify and prioritize load reduction measures and accounting methods. Prepare a report of recommendations on behalf of the SAB for submittal to the Secretary of DENR. Continue development of an existing development model program and collaborate with the Upper Neuse River Basin Association on the development of credit for additional nutrient reducing measures.
5. Buffer Rules– Assist in oversight of local government implementation in the Jordan watershed, and respond to information requests on buffer rule requirements.
6. Wastewater Rules– Coordinate w/ point source staff on review of annual loading reports from a coalition of dischargers.
7. State and Federal Rule– Assist the Stormwater Permitting and Transportation Permitting Units with implementation of new development and buffer rule requirements. Work with DOT and other state/federal entities on design of programs.
8. Trading Rules– Assist other NPS Planning Unit staff and 401 Unit staff with development of policies and administrative procedures to implement nutrient offset options for New Development and trading provisions of rules. Complete policy development on the Division's role in approving credit for load reduction work done using public funds.
9. Fertilizer Management Rule– Coordinate with NC Cooperative Extension Service to develop and disseminate notification of, and carry out training for fertilizer applicators. Coordinate with Land Application Unit on setting nutrient requirements in renewals of residuals application permits.
10. Provide quarterly implementation reports to the ERC of the General Assembly.

d. State Match

There will be no state match associated with this activity

e. Federal Request:

Salary (3.5 FTEs)	$196,623
Fringe (3.5 FTEs)	$62,252
Indirect (16.7% salary)	$32,706
Total	**$291,581**

f. Project Period:

October 1, 2012 to September 30, 2013

Activity NCI-2. Watershed Implementation (DWQ)

a. Overview

Within the Division of Water Quality (DWQ) there are several positions which play key technical and planning roles in recruiting, implementing, assessing, and tracking restoration activities for impaired waters. This work involves formulating and implementing creative solutions to restoring impaired waters for activities such as agriculture, urban stormwater runoff, construction, forestry, and mining. Watershed restoration objectives are best achieved through collaboration with our partners in industry, non-profits, local, state and federal government, consultants, and citizens to assess the causes of pollution in impaired waters, develop watershed action and outreach plans, then implement projects and provide education to address pollution sources. An important part of watershed restoration is the assessment and documentation of these efforts.

Primary activities covered by these positions include:

Restoration Prioritization and Tracking
Identify and prioritize impaired streams and their associated 12-digit HUCs that will serve as candidates for improvement and restoration. Work with DWQ Water Quality assessment coordinator to track restoration activities on impaired waters by various programs (i.e., 319, Clean Water Management Trust Fund (CWMTF), agricultural cost share program, WRP, and NRCS) within selected 12-digit HUCs.

Restoration Initiatives
Once water(s) has/have been prioritized for restoration and the associated 12-digit HUCs identified, identify and contact the local parties serving as the champion(s) or local watershed coordinators. Help recruit restoration projects to be funded through the federal 319 NPS grant program and other funding sources.

Technical Assistance and Resource Development
Assistance is provided to local watershed groups, in cooperation with other state and federal agencies, in the following areas:

- Identifying general needs for watershed effort and how they can be met
- Developing and implementing management strategies to restore impaired water quality
- Walking streams to help identify potential sources of water quality problems
- Identifying and leveraging funding sources,
- Selecting contractors to perform certain tasks,
- Prioritizing and selecting management measure locations,
- Water quality monitoring for assessment or tracking improvement

Monitoring and Assessment

Staff provides intensive and routine assessment of water quality issues in the Lower Neuse and Pamlico and surrounding areas. The focus is primarily on nutrient-related work in the Neuse, Tar-Pamlico and Chowan River Basins, all three of which are classified as Nutrient Sensitive Waters, as well as monitoring and assessment work in the Roanoke and Pasquotank. The data collected is essential in assessing the effectiveness of the nutrient sensitive water rules and the Neuse and Tar-Pamlico nutrient TMDLs. The monitoring and assessment of routine long-term monitoring studies now includes a total of 69 monthly monitoring sites.

Water quality issues in the Pamlico and Lower Neuse Rivers and other estuarine waters dictate frequent evaluation and response by the Division of Water Quality (DWQ). Environmental conditions and evaluations associated with a response to fish kills, algal blooms, or other environmental investigations in coastal water bodies requires dedicated and talented staff. Assessments include collection of data and immediate transfer of those data to decision makers in the areas of fisheries, environment, and human health. Scientific knowledge regarding harmful algae blooms and decisions on actions associated with human health are additional challenges supported by this work.

Staff supports ongoing activities in the regional and central offices of DWQ and works with university researchers or other agencies to collect environmental data, fish, or other organisms according to specific needs. Other duties include assisting in maintenance of continuous monitors, citizen complaint investigations, and buffer rule investigations.

The following are more specific examples of the watershed work being conducted:

- Coordinate key partners in addressing NPS pollution in our targeted watersheds
- Work with county Soil and Water Conservation Districts and local watershed groups in ag impaired watersheds to prioritize and site BMPs that target stressors identified through our assessments and the WBP.
- Provide technical knowledge, field and laboratory resources to monitor restoration sites before and after BMP implementation in order to measure progress toward WBP targets.
- Identify opportunities for restoration through partner interaction, field assessments, and general knowledge of the mountain watersheds.
- Coordinate with our partners to leverage non-319 funds such as the US FWS's Partners for Fish and Wildlife grants, Clean Water Management Trust Fund, Cherokee Preservation Foundation grants, Water Resources Development Project grants, Z Smith Reynolds Foundation grants, Duke Riparian Enhancement Fund, EPA Urban Waters Grant Program, matching funds from private industry partners, and other public and private funding sources.
- Provide assistance to our non-profit and local government partners in drafting grant applications
- Assist grantees in managing work plans and reporting for watershed projects
- Assist in the development, writing, and implementation of 9 element watershed action plans

- Work with cities, municipalities, and private commercial landowners to site and develop BMPs such as constructed wetlands in urban watersheds.

b. Milestones Supported

This activity supports Action 1 of Objective 3 for Goal 1 (Protection) and Action 1 of Objective 5 for Goal 2 (Voluntary Watershed Restoration) for the NC NPS Management Program's 5-Year Action Plan.

c. Outputs

Listed below are expected outputs for the coming year:

Prioritization and Tracking

- Work with many different groups to prioritize watersheds for restoration.
- Continue to report at least one 12-digit HUC with measurable improvement each year (SP12).
- Track restoration activities within each 12-digit HUC and document how activities are related to water quality improvement.

Assistance to Local Watershed Groups

- Reviewing and/or helping to prepare grant applications and watershed action plans.
- Identifying and helping to leverage funding sources
- Assist in water quality monitoring for assessment, identification of problem sources and/or tracking improvement
- Assist in stream walking to help identify potential sources of water quality problems.
- Attend local watershed group meetings
- Helping to prioritize catchments within watershed on which to focus
- Helping to identify and/or prioritize management measure locations and other technical assistance

Resources Development

Continue to develop resources to assist local watershed groups restore their watersheds.

- Identify additional resources for watershed groups and place on DWQ's Use Restoration Waters (URW) website. Resources may include assistance with financial, technical, and capacity-building needs.
- Develop watershed map for URW website which would identify locations of active local watershed groups and watershed restoration plans in NC that meet EPA's 9-element guidance.

Monitoring and Assessment

- Conduct monthly ambient monitoring sampling, including nutrients, for physical and chemical parameters at sites in the Neuse, Tar-Pamlico and Chowan River basins, all of which are classified as Nutrient Sensitive Waters and prioritized for nitrogen and/or phosphorus reductions.
- Conduct monthly ambient monitoring sampling for physical and chemical parameters at sites in the Pasquotank and Roanoke River Basins.
- Conduct probabilistic sampling at 4 monthly random ambient monitoring sampling sites for physical and chemical parameters.
- Continue nutrient sample collection on a weekly basis at 5 sites.
- Investigate approximately 10-20 fish kills and 12 algae blooms.
- Conduct 40 riparian buffer determinations and prepare reports.

Watershed and Project-Specific Work

Little Tennessee River, Franklin to Fontana Watershed Restoration Project (impaired for fecal coliform bacteria [recreation] and biological integrity [benthos])

- Assist in the development of 9 element watershed action plan (WAP).
- Monitor restoration sites for fecal coliform bacteria and other parameters upstream and downstream of BMPs such as cattle exclusion fencing before and after implementation.
- Assist in outreach events such as landowner field days and the "Shade Your Stream" campaign which targets streamside landowners and farmers.
- Coordinate with key funding partners to leverage additional funding and resources.
- Serve on Franklin to Fontana technical advisory committee and attend meeting of the Partners for Little Tennessee group.

North Toe River Restoration Project (impaired for turbidity)

- Assist in the development of 9-element watershed action plan.
- Install and maintain single stage sediment samplers on major tributaries of the North Toe River. These passive samplers monitor turbidity and TSS at different stages during storm events. Will compile, interpret, and include this data in the WAP watershed assessment segment.
- Serve on the North Toe project technical advisory committee and the outreach committee. Both of these committees meet on separate dates quarterly or as needed.
- Coordinate with additional funders to leverage and acquire funding for the Grassy Creek Shopping Center stream restoration and stormwater BMP project. Funding is being sought through the CWMTF, Partner for Fish and Wildlife, and Water Resources Development Project grants.

Mills River Restoration Project (impaired for biological integrity [benthos])

- Assist in the development of 9-element watershed action plan.
- Provide monitoring support.

Richland Creek Restoration Project (impaired for fecal coliform [recreation] and biological integrity [fish community])

- Serve on the technical advisory committee.
- Continue to monitor fecal coliform in the watershed to document improvement from past restoration efforts and identify future restoration needs.
- Continue to co-coordinate the Richland Creek fish reintroduction project. This multi-partner project seeks to restore the native fish population to Richland Creek upstream of Lake Junaluska thereby removing the stream from the 303d list for fish community.
- Participate in field days to educate farmers about BMPs.

Mud Creek Restoration Project (impaired for biological integrity [benthos and fish])

- Serve on the technical advisory committee.
- Provide support for possible future restoration activities.

Norton Creek Restoration Project (Transylvania County)

- This is a two year project funded by the EPA Urban Waters Grant Program to assess stressors in the Norton Creek watershed, develop a WAP, provide education and outreach to the Rosenwald Community, and implement BMP projects.
- Conduct background and stormwater sampling for various parameters and provide interpretation of data for WAP.
- Participate in the development and implementation of an outreach program.

Scotts / Savannah Creek Restoration Project (Jackson County)

- Provide before and after ag BMP implementation monitoring for the Kelly Farm project on Savannah Creek.
- Conduct 5 samples in 30 day period for fecal coliform on Scotts Creek to determine if stream is meeting standards following restoration activities and fecal source identification and removal.
- Continue to support the Scotts Creek monitoring partnership.

Region-wide Efforts

- Perform monitoring before and after cattle exclusion fencing installation at sites throughout the region to determine effectiveness of this BMP.
- Conduct presentations upon request to various organizations and groups in the Region. These presentations give information about watershed health, stressors, and efforts to address problems.
- Continue to serve as a technical advisor to the Environmental Quality Institute (EQI): www.environmentalqualityinstitute.org/

d. State Match

There will be no state match associated with this activity.

e. Federal Budget Request:

DENR will support three FTE staff salary and fringe costs.

Salary (3 FTEs)	$154,113
Fringe (3 FTEs)	$48,498
Indirect (16.7% of salary)	$25,036
Total	**$227,647**

f. Project Period: October 1, 2012 to September 30, 2013.

COMPETITIVE WATERSHED PROJECTS

Recipient	Project Name	319 Funding	Match	Total
City of Hendersonville	Britton (Brittain) Creek Stormwater Management – Mud Creek Watershed Restoration Project	$121,528	$260,322	$381,850
Town of Pittsboro	Stormwater BMPs in the Town of Pittsboro and Robeson Creek Watershed	$161,726	$107,817	$269,543
NCSU	Engaging Youth in Improving Burnt Mill Creek through High Prioirty Storm Water Retrofits	$198,938	$133,240	$332,178
NCCF	Cleaning Up the Water around Oak Island, NC	$114,694	$77,371	$192,065
DSWC	Implementation of Nine-Element Watershed Restoration Plan in the Dan River Basin	$295,000	$330,486	$625,486
NCSU	Implementing and Evaluating Stormwater BMPs in Durham	$64,052	$53,742	$117,7794
NCSU	Implementation of the Regenerative Stormwater Conveyance Technology to Stabilize an Erosional Gully	$132,854	$94,992	$227,846
Char-Meck Storm Water	Briar Creek Stream Restoration	$100,141	$66,760	$166,901
COMPETITIVE WATERSHED PROJECTS TOTAL		**$1,188,933**	**$792,622**	**$1,981,555**

Project I-1: Britton (Brittain) Creek Stormwater Management – Mud Creek Watershed Restoration Project

1. Project Title	Britton (Brittain) Creek Stormwater Management -- Mud Creek Watershed Restoration Project				
2a. Grantee Primary Contact or Project Manager[1]					
Name	Diane Silver				
Title	Mud Creek Watershed Coordinator				
Organization Name	Mud Creek Watershed Restoration Project				
E-mail address	mudcreek@diane-silver.com				
Mailing Address	104 Pershing Road				
City	Asheville	State	NC	Zip	28805
Telephone	828 298 7084	Fax Number		NA	

[1] A one-page Statement of Qualifications must be provided in Section 3 of the application form to confirm that any- one designing, installing, or monitoring the proposed project is qualified to do so. Include in the statement any past and/or ongoing 319 grant funded projects.

2b. Grantee Execution Address (where contract will be mailed for signature)					
Name	Brent Detwiler				
Title	City Engineer				
Organization Name	City of Hendersonville				
E-mail Address	bdetwiler@cityofhendersonville.org				
Mailing Address	305 Williams Street				
City	Hendersonville	State	NC	Zip	28792
Telephone	828 697-3000	Fax Number			
Federal Tax ID Number	56-6001242				

2c. Grantee Payment Address (where invoice payments will be mailed)					
Name	Brent Detwiler				
Title	City Engineer				
Organization Name	City of Hendersonville				
E-mail Address	bdetwiler@cityofhendersonville.org				
Mailing Address	305 Williams Street				
City	Hendersonville	State	NC	Zip	28792
Telephone	828 697-3000	Fax Number			

3. Required Statement of Qualifications (to confirm that anyone designing, installing, or monitoring the proposed project is qualified to do so. Include in the statement any past and/or ongoing 319 grant funded projects.)

William F. **Hunt, III, Ph.D., PE**
Associate Professor and Extension Specialist
Biological and Agricultural Engineering North
Carolina State University

Project Role:
Installation and monitoring of stormwater management practices on three community sites

Statement of Qualifications:

Exemption 6 Personal Privacy

REDACTED

3. Required Statement of Qualifications - cont.

Ryan Winston
Extension Associate, NC State University
Department of Biological and Agricultural Engineering (BAE)

Project Role:
Installation and monitoring of stormwater management practices on three community sites

Statement of Qualifications:

REDACTED

Exemption 6 Personal Privacy

3. *Required Statement of Qualifications - cont.*

6) City of Hendersonville
Project role: Streambank Stabilization - Matching funds

Statements of Qualifications:

Brent Detwiler- City Engineer

REDACTED

Exemption 6 Personal Privacy

Jacob Grieb – Civil Engineer

REDACTED

Exemption 6 Personal Privacy

Exemption 6 Personal Privacy

REDACTED

3. *Required Statement of Qualifications - cont.*

City of Hendersonville - Cont.

Keith Fogo- Construction Inspector

REDACTED

Exemption 6 Personal Privacy

3. Required Statement of Qualifications - cont.

THE ENVIRONMENTAL QUALITY INSTITUTE
75 FAIRVIEW ROAD, SUITE B
ASHEVILLE, NC 28803
Phone: 828-333-0392
www.eqilab.org

REDACTED

ENVIRONMENTAL QUALITY INSTITUTE

Project Role:
Water quality analysis for VWIN monitoring.

Statement of Qualifications:
The Environmental Quality Institute (EQI) is a nonprofit environmental research laboratory dedicated to providing objective chemical and biological analyses to help communities, government agencies, and the private sector gain accurate understanding of complex environmental issues. EQI conducts laboratory analyses of stream and lake water samples and provides scientific interpretation to stakeholders, including local county governments, municipalities and watershed advocacy groups. These monthly data allow discernment of spatial and temporal trends in water chemistry within Western North Carolina (WNC) watersheds, as well as the identification and quantification of significant point and nonpoint sources of pollution. The lab currently analyzes nearly 200 stream and lake samples monthly in 13 WNC counties, which are located in the French Broad, Little Tennessee, Hiwassee, Broad, and Catawba watersheds. The quality of EQI's analytical results is supported by the completion of **NC Wastewater Certification** laboratory requirements, through the Department of Environment and Natural Resources. Current testing includes **pH, turbidity, total suspended solids, conductivity, ammonia-nitrogen, orthophosphate, total phosphorus, lead, copper, zinc, and fecal coliform analysis.** EQI also analyzes surface waters for **nitrate/nitrite-nitrogen and alkalinity**, but is not certified for those tests.

Ann Marie Traylor is the **Executive Director** of EQI.

Exemption 6 Personal Privacy

EQI also recruits local university student interns to work in as laboratory technicians. The Board of Directors is staffed by former EQI management, university professors, chemists, and nonprofit professionals. **For more information** regarding staff, publications, and projects, please visit www.eqilab.org, or contact Ann Marie Traylor at amt@environmentalqualityinstitute.org.

319(h) Grant Funds Requested	$121,528
Match funds or in- kind Match Services	$260,322
4. Total Project Cost	$381,850

5. Project Start Date	Jan 1, 2014	***Project End Date***	Dec. 31, 2015

6. Project Location – REQUIREMENT: Important to submit as completely as possible, especially the Lat/Long coordinates and NC Impaired Waters List Assessment Unit Number. (NOTE: Payment of 319 Invoices will be held if all required information is not submitted in quarterly reports and the final reports, AU numbers, Lat/Long, and coordinates for all installed BMP practices)	
River Basin	French Broad
Watershed(s)	Mud Creek Watershed (303-d listed); Brittain Creek sub-watershed
Watershed size	Britton Creek: 2195 acres
Impaired Waters Listed Stream	Yes **X** (Mud Creek) No
Impaired Waters List Assessment Unit Number	6-55C
HUC(s) (12 digit USGS Hydrologic Unit Codes)	Upper Mud Creek: 060101050301 Lower mud Creek: 060101050303
County	Henderson
USGS. 7.5 minute topographic quadrangle map(s) in project area	Henderson
Position coordinates of project location	Project — Lat — Long Britton Creek sub-watershed 35° 20' N 82° 27' W Opportunity House 35° 19' 42" N 82° 28' 7" W Calvary Baptist Church 35° 20' 13" N 82° 29' 24" W

7. *NPS Pollution Sources to be addressed (Check all that apply)*			
	Agriculture		Waste Disposal (includes onsite systems)
	Construction		Hydrologic Modification
	Silviculture		Marina and Recreational Boating
X	Urban runoff/Stormwater		Groundwater Loading
	Resource Extraction		Natural Sources
	Habitat Modification (drainage/filling wetlands, streambank destabilization)		Other:

8. *NPS Pollutants to be addressed (check all that apply)*			
X	Excess Nitrogen		Pesticides
X	Excess Phosphorus	X	Oil and grease
X	Sedimentation	X	Temperature
X	Pathogens/Bacteria		pH
X	Metals		Alterations
	Low dissolved oxygen		Other:

9. *Estimate Load Reduction, if checked for excess nitrogen, excess phosphorus and/or sedimentation*[2]	
# pounds of nitrogen saved from project implementation: **31.89 lbs/yr**	Reference: **Jordan Lake Nutrient Accounting Tool**
# pounds of phosphorus saved from project implementation: **3.48 lbs/yr.**	Reference: **Jordan Lake Nutrient Accounting Tool**
# tons of soil saved from project implementation: **3682 lbs/yr**	Reference: **Estimate based on the Curve Number method for a typical year, 50% volumetric reduction for each bioretention cells, and 85% TSS concentration reduction.**
Load Reduction Model Used: STEPL, Region 5, L-THIA, Other	**Jordan Lake Nutrient Accounting Tool TR-55 Curve Number Method, NRCS, 1983.**

7) [2] Providing a load reduction estimate is required for all BMP implementation projects, including demonstrations.

10. *Do you intend for collected data to be used by DWQ for Use Support decisions?*	
NO	**Explanation:** Use support will continue to be determined by DWQ's regular basin-wide assessment.

11. *Do you propose to install BMPs or other ag management measures that would be eligible for NC Agricultural Cost Share Program (ACSP) funding? If Yes, please document that the demand for ACSP funding in your county exceeds the supply, prompting your application for a 319(h) grant.*

Yes - Not Ag, but Community Conservation Assistance Program (CCAP)	No

In recent years, Henderson County Soil and Water was allocated approximately $4000 in CCAP funds. In each of those years, they received approximately $63,000 worth of requests. In this competitive environment, it is unlikely that these projects would be funded through CCAP. See http://www.ncagr.gov/sw/acspdatabasereports.html for documentation of CCAP allocation.

12. *Does this proposal address needs that were identified in a DWQ basin plan? If yes, please identify the specific need and the basin in which the need is outlined.*

YES

Explanation:

French Broad Basin Report, April 2011

pp. 26-27:

"General Basinwide Recommendations:
Stormwater mana ement, erosion control and education should be increased alon with associated inspections of all sites with potential for erosion. Low-impact development should be encoura ed throu hout the basin. Cisterns, rain ardens, permeable pavement, and other measures can be used to reduce stormwater runoff. Decreasin the volume of stormwater runoff, can reduce the amount of erosion from stream channels and banks and help to reduce the amount of sediment in the stream and overall turbidity.

"Watershed Specific Recommendations:
Many recommendations in Table 5 require continued technical and financial support by DWQ for on oin partnerships.

Table 5: Recommendations Specific to Impaired Waterbodies

Recommendation	Responsible Parties	Action(s)
Restore waters throu hout Mud Creek Watershed	Mud Creek Watershed Council, Henderson County Cooperative Extension Service	This diverse watershed has both a ricultural and urban impacts. Thou h much has been accomplished more a ricultural and urban mana ement measures are needed.

12 cont. ***Specific needs identified in a DWQ basin plan:***	
	French Broad Basin Report, April 2011 — cont. p. 46: "Recommendations: Stormwater management, erosion control and pesticide education should be increased. The installation of BMPs that control stormwater and prevent its associated pollutants from reaching surface waters is encouraged. .... DWQ should continue to support the Mud Creek and Mills River subwatershed efforts in improving water quality in those watersheds. These are both important agricultural and fast growing subwatersheds."

13. Project Abstract (short concise summary of the project – DO NOT EXPAND SPACE PROVIDED)
Mud Creek, in Henderson County, NC, is a 303-d listed stream that has been identified by DWQ as a watershed of interest. This proposal aims to continue to address the sources and causes of impairment in the Mud Creek watershed through the following specific projects: • Install three stormwater bioretention practices on large impervious areas within the Britton (Brittain) Creek sub-watershed to begin addressing impairment due to stormwater run-off. • Monitor the effectiveness of the installed practices to inform best practices for stormwater management specific to conditions in Western NC. • Develop of stormwater BMP manual specific to the mountain region. • Maintain monthly volunteer monitoring at fourteen sites in the Mud Creek watershed, through the VWIN program. • Provide 1/10-time funding for two years for a watershed project coordinator for grant administration, project coordination, and public education.

14. Funding Requested

Budget Categories (itemize all categories)	Section 319				Non-Federal Match *				Total	Justification (Include detailed explanation for each budget line item)
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4		
Personnel/Salary	3,075	6,150	3,075		9,261	13,891	0		35,452	Project coordinator: 2 yrs @ 10%time; + staff match from City of Hville.
Fringe Benefits									0	
Supplies	0	3,500	0						3,500	misc supplies for design, planning; 4 intepretive signs for project sites; flyers, mailings, etc. to solicit participants for future projects.
Equipment	0	2,000	0						2,000	equip for const/monitoring of bioretention cells
Travel	3,903	4,028	125						8,055	mileage, per diem, and lodging, Raleigh to Hendersonville; 2 people, over 2 years; + $250/yr local mileage for project coordinator
Contractual	8,811	43,286	0		7,273	90,564	86,200		236,133	asphalt removal, grading, planting, etc for bioretnetion cells; + engineering design & const. supervision from NC State. Match from NC State faculty + City const. projects.
Monitoring	3,500	13,168	7,905		3,289	11,668	6,925		46,455	monitoring of installed BMPs, + 15 VWIN sites for 2 years
Other (BMP Manual)	0	6,168	4,405		0	5,091	3,636		19,300	NC State time for creation of BMP manual
Total Direct	19,288	78,299	15,511		19,822	121,214	96,761		350,895	
Indirect (max. 10% of direct costs, per 40 CFR 35.268)	2,108	4,215	2,108		5,631	11,263	5,631		30,955	10%overhead for NC State's contribution; 17.3% overhead match from NC State
Annual Totals	21,396	82,514	17,618		25,453	132,476	102,393		381,850	
Grand Total	121,528				260,322				381,850	
% of Total Budget	32%				68%				100%	

*Note: Non-Federal match must be a minimum of 40% of the total project budget

Year 1: January 1 - June 30, 2014 (6 months) – Total MUST equal sum of quarters 1-2 in Milestone Table #18 **Year 2**: July 1, 2014-June 30, 2015 (12 months) – Total MUST equal sum of quarters 3-6 in Milestone Table #18 **Year 3**: July 1, 2015-June 30, 2016 (12 months) – Total MUST equal sum of quarters 7-10 in Milestone Table #18 **Year 4**: July 1 - December 31, 2016 (6 months) – Total MUST equal sum of quarters 11-12 in Milestone Table #18

15. Budget Summary (Combined federal and match funds)								
	BMP Implementation	Project Management	Education, Training or Outreach	Monitoring	Technical Assistance	Other	Total	% of total budget
Personnel	23,152	12,300					35,452	9%
Fringe Benefits							0	0%
Supplies	1,500		2,000				3,500	1%
Equipment	2,000						2,000	1%
Travel	7,555	500					8,055	2%
Contractual	236,133			46,455			282,588	74%
Operating Costs	12,382		9,287	9,287			30,955	8%
Other			19,300				19,300	5%
Total	282,722	12,800	30,586	55,741	0	0	381,850	100%
% of total budget	74%	3%	8%	15%	0%	0%	100%	

16. Local and State Match (non-federal) Summary	
Total Match amount	$263,522
Cash Match	$172,400
In-kind Match	$87,922
Source(s) of Cash Match	Contractual construction for City of Hendersonville stream restoration projects.
Source(s) of In-kind Match	• Staff time + overhead for NC State University faculty / Extension specialists • Volunteer time for WWIN monitoring • In-house design work for City of Hendersonville stream restoration projects

17. Project Partners (may add more, if needed)[3]			
Agency Name	City of Hendersonville		
Agency Address	305 Williams Street, Hendersonville, NC 28792		
Role/contribution to Project	Grant contractor; fiscal agent; installation of stream restoration projects serving as matching funds.		
Contact Person	Brent Detwiler, City Engineer	Phone No.	828 697 3000
E-mail address	bdetwiler@cityofhendersonville.org		
Agency Name	Biological and Agricultural Engineering, NC State University		
Agency Address	3110 Faucette Drive, Raleigh, NC 27695-7625		
Role/contribution to Project	Technical Assistance. Design & Construction Oversight. Monitoring Oversight.Data analysis & reporting. BMP Manual Supplement.		
Contact Person	William F. (Bill) Hunt, III, Ph.D., PE	Phone No.	919-515-6751
E-mail address	wfhunt@ncsu.edu		
Agency Name	Environmental and Conservation Organization		
Agency Address	121 Third Avenue West, Suite 4, Hendersonville, NC 28792		
Role/contribution to Project	Management of volunteers for water sample collection for chemical monitoring under the VWIN program. Analysis carried out by Environmental Quality Institute.		
Contact Person	Rachel Hodge, Executive Director	Phone No.	692-0385
E-mail address	director@eco-wnc.org		
Agency Name	Environmental Quality Institute		
Agency Address	75 Fairview Road, Suite B, Asheville, NC 28803		
Role/contribution to Project	Water Quality Monitoring - chemical analysis of VWIN samples.		
Contact Person	Anne Marie Traylor	Phone No.	(828) 333 0392
E-mail address	eqi@EnvironmentalQualityInstitute.org		

[3] **A one-page Statement of Qualifications must accompany applications to confirm that anyone designing, installing, or monitoring the proposed project is qualified to do so. Include in the statement any past and/or ongoing 319 grant funded projects.** *See pp. 2-6.*

18. Project Milestone Schedule

Time Period/Date	Activities (List specific quantifiable outputs or activities that will be achieved during each quarter)		Anticipated % of Requested Funding Spent[1]			
from Section 23, page 30	Deliver-able #		QS	Q %	Cum S	Cum %
First Quarter Jan-Mar 2014	1 2 5 7	Begin Design of Retrofits Preparation & submission of QAPP Monthly monitoring of 14 VWIN sites 1 Quarterly Report	$ 9,439	8%	$ 9,439	8%
Second Quarter Apr-June 2014	1 3 5 7	Complete Retrofit Design. Bid Projects Meet with mountain-area designers for BMP Manual. Monthly monitoring of 14 VWIN sites 1 Quarterly Report	$ 11,957	10%	$ 21,396	18%
Third Quarter July-Sept 2014	1 2 3 5 6 7	Construct all retrofits. Install monitoring equipment. Begin Mountain BMP manual write up. Monthly monitoring of 14 VWIN sites 1 newspaper article describing construction and the purpose --"what's going on" 1 Quarterly Report	$ 53,707	44%	$ 75,102	62%
Fourth Quarter Oct-Dec 2014	2 3 5 6 7	Begin Monitoring. Continue Mountain BMP manual write up. Monthly monitoring of 14 VWIN sites Installation of interpretive signs 1 Quarterly Report	$ 11,440	9%	$ 86,543	71%
Fifth Quarter Jan-Mar 2015	2 3 5 7	Continue monitoring Complete first draft of Mountain BMP Manual Monthly monitoring of 14 VWIN sites 1 Quarterly Report	$ 7,928	6%	$ 94,471	77%

[1] Please show anticipated dollar amount, percent of grant spent that quarter, and cumulative percent of grant spent for project. Quarterly invoices will only be reimbursed up to percent indicated. Unused funds will carry forward to next quarter.
[2] 10% of grant will be held until receipt of Final Project Report

Note: Sum of funds spent in quarters 1-2 MUST equal year 1 total in Budget Table #14
Sum of funds spent in quarters 3-6 MUST equal year 2 total in Budget Table #14
Sum of funds spent in quarters 7-10 MUST equal year 3 total in Budget Table #14
Sum of funds spent in quarters 11-12 MUST equal year 4 total (min. 10% of 319 funds)

18. Project Milestone Schedule - cont.						
Sixth Quarter Apr-Jun 2015	2 3 5 7	Continue monitoring Present Draft to 'Mountain BMP designers." Begin incorporating recommendations. Monthly monitoring of 14 VWIN sites 1 Quarterly Report	$ 9,439	8%	$ 103,910	85%
Seventh Quarter July-Sept 2015	2 3 5 7	Complete monitoring Complete 2nd draft of Mountain BMP Manual Supplement. Monthly monitoring of 14 VWIN sites 1 Quarterly Report	$ 4,628	4%	$ 108,538	89%
Eighth Quarter Oct-Dec 2015	2 3 4 5 7	Analyze data and report. Conclude project. Submit manual to DENR Completion of matching stream restoration projects. Monthly monitoring of 14 VWIN sites 1 Quarterly Report. 1 Final Report.	$ 12,990	11%	$ 121,528	100%

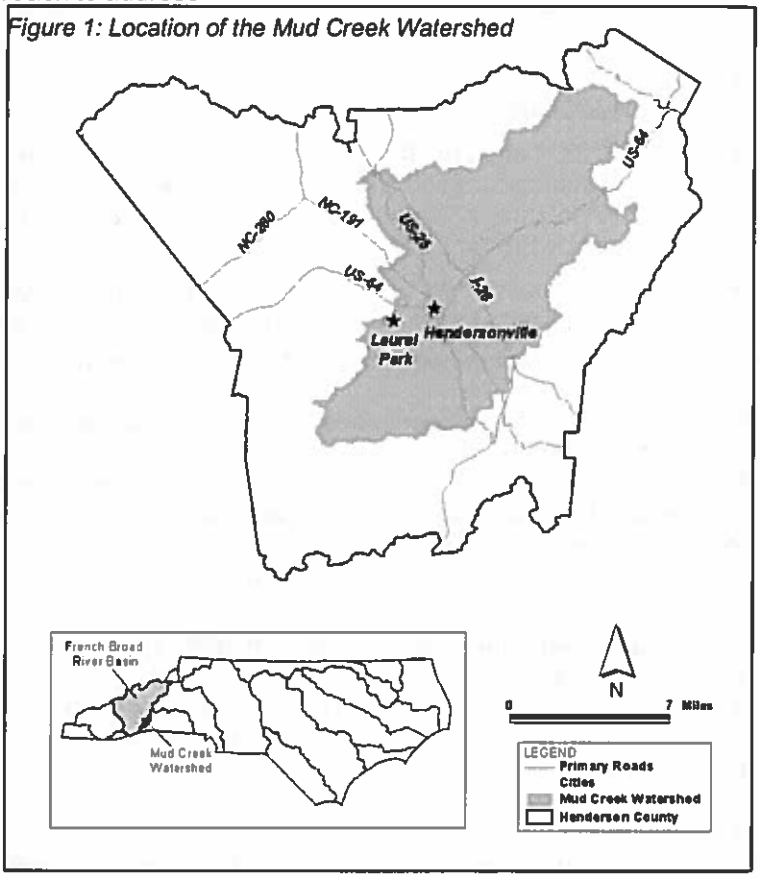
[1] Please show anticipated dollar amount, percent of grant spent that quarter, and cumulative percent of grant spent for project. Quarterly invoices will only be reimbursed up to percent indicated. Unused funds will carry forward to next quarter.
[2] 10% of grant will be held until receipt of Final Project Report

Note: Sum of funds spent in quarters 1-2 MUST equal year 1 total in Budget Table #14
Sum of funds spent in quarters 3-6 MUST equal year 2 total in Budget Table #14
Sum of funds spent in quarters 7-10 MUST equal year 3 total in Budget Table #14
Sum of funds spent in quarters 11-12 MUST equal year 4 total (min. 10% of 319 funds)

19. Background and goals of the project. Expand space, if necessary

In Henderson County, NC, Mud Creek and several of its tributaries are on the state's 303(d) list of impaired waters. Various studies reveal biological and habitat degradation throughout the Clear Creek and Mud Creek watersheds due to the cumulative impact of toxicants; stream channelization; unstable, eroding stream banks, and severe sedimentation. Because these watersheds are experiencing biological degradation, they are deemed not suitable for TMDL development. EPA recommends a watershed planning approach to address sources and causes of impairment in these situations.

Figure 1: Location of the Mud Creek Watershed



Early history of the Mud Creek Project:

- 2000: Land of Sky Regional Council of Governments convened local stakeholders in the Mud Creek watershed to combine and focus stream conservation efforts. The Mud Creek Watershed Council has remained an informal but active coalition of partner agencies, organizations, local government officials and staff, and private entities.
- 2000 – 2003: Division of Water Quality (DWQ), under the Watershed Assessment and Restoration Program (WARP), conducted intensive monitoring and analysis to identify causes and sources of stream impairment in Mud Creek and its tributaries, and to develop watershed management strategies. (Final report: *Biological Impairment in the Mud Creek Watershed*, DWQ, 2003).
- 2000-2003: Tennessee Valley Authority, under contract with NC Wetlands Restoration Program (now the Ecosystem Enhancement Program), collected additional stream and watershed data and created a GIS database and Integrated Pollutant Source Identification (IPSI) Report (*Mud Creek Watershed Nonpoint Source Pollution Inventory and Pollutant Load Estimates*, TVA, 2001).
- 1992 - 2003: The Volunteer Water Information Network (VWIN), operated by the University of North Carolina at Asheville, monitored nine sites monthly within the Mud Creek Watershed (six since 1992; nine since 1998). Monitoring has continued to the present time.
- 2003: The Mud Creek Council synthesized the information and recommendations from the above listed studies and produced a Strategic Plan for the watershed (*Watershed Restoration Plan for the Mud Creek Watershed*, Mud Creek Watershed Restoration Council, January 2003).

19. Background and goals of the project - cont.

- 2003: Funding was received to support a full-time coordinator for the Mud Creek Project, and efforts have been on-going to implement the strategies listed in the Strategic Plan. Activities first focused on intensive education to publicize the challenges at hand and the effort to address them. Subsequent work has focused on securing willing landowners for BMP and restoration projects in focused sub-watersheds, and implementing these projects with the goal of making incremental progress toward in-stream improvement. Work has also focused on capacity-building within the local community to improve private stream management practices, and on-going education efforts throughout the watershed.
- 2006: A 9-Element Watershed Implementation Plan in EPA-designated format was completed for the Clear Creek sub-watershed.
- 2006-2012: Targeted efforts in the Clear Creek sub-watershed aimed at pesticide reduction and streambank stabilization efforts in Clear Creek subwatershed resulted in 50 percent of the assessment units in that subwatershed being restored. These improvements were officially approved by EPA in 2009, under a policy measure known as SP12.
- 2011-12: A master stormwater management plan was completed for the Britton/Brittain Creek sub-watershed, and is being formatted into the required EPA 9-element format.

A history of specific watershed accomplishments can be provided upon request.

While good progress has been made, much work remains. The current DWQ French Broad basin plan (April, 2011) states:
"Mud Creek [AU # 6-55c] is impaired for biological integrity due to Fair ratings at benthic macroinvertebrate sampling site EB120 in 2001 and EB309 in 2000. Benthic macroinvertebrate sampling site EB122 received a Poor rating in 2001. Also, fish community sampling site EF35 was rated Poor in 2002. All of these sites are located in urban areas."

Lower Mud Creek Subwatershed (060101050303)
Mud Creek [AU # 6-55d] is Impaired for biological integrity due to a Fair rating at benthic macroinvertebrate sampling site EB123 in 2007. This section of the creek may be suffering from local habitat degradation and cumulative water quality impacts from throughout the watershed (p. 37).

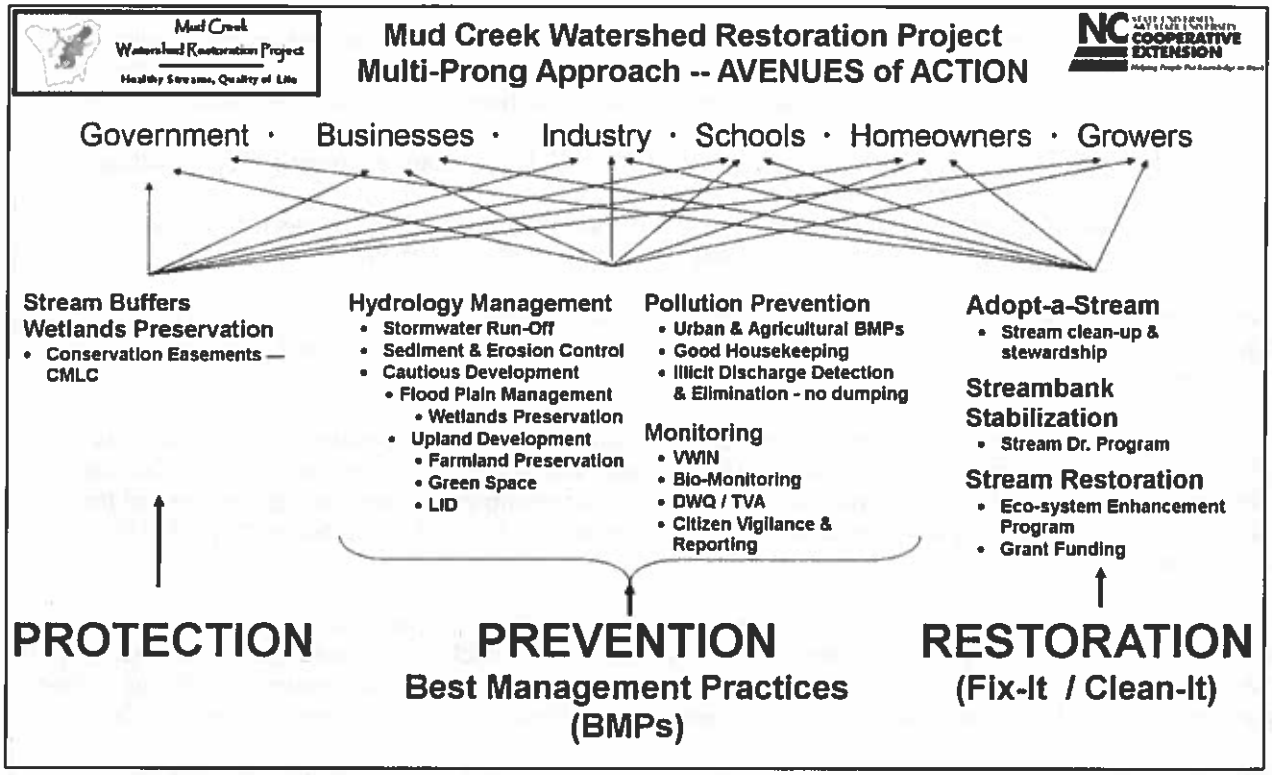
The Mud Creek Strategic Plan includes a broad range of activities that make up its "multi-prong approach" to watershed management (see figure 2). With this proposal, we seek to continue carrying out the strategic plan for the Mud Creek watershed, shifting focus from agriculture impacts in Clear Creek to begin addressing urban impacts within the city limits of Hendersonville. Specifically we plan to begin an urban stormwater management campaign in the focused sub-watershed of Britton/Brittain Creek. Brittain Creek flows into Mud Creek just upstream of AU 6-55d mentioned above (see figure 3).

Goals of this proposal:

- Install and monitor three bioretention areas on sites of concentrated imperviousness within the Brittain Creek sub-watershed to manage run-off from large paved areas. These areas happen to be community properties (a community center and a church), with high levels of public presence. Thus these projects will also serve as highly visible demonstration projects, although they were chosen simply as high-impact sites in the sub-watershed.
- Using monitoring results from the three bioretention areas, create a supplement to the state stormwater BMP manual, specific to conditions in the mountain region.

19. Background and goals of the project - cont.

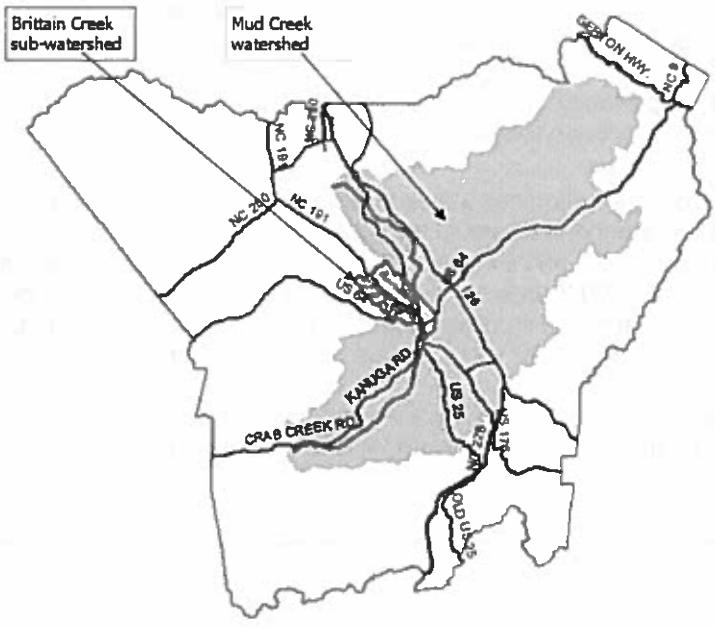
Figure 2: Mud Creek Watershed Project – Multi-Prong Approach



Goals, cont.

- Install up to three additional streambank stabilization projects in the Mud Creek watershed, as matching projects.
- Continue monthly monitoring of 14 critical streams sites in the Mud Creek watershed.
- Continue general education to encourage both private and public efforts to improve water quality, including signage at BMP sites and a campaign to promote "downspout disconnects" and "groundwater gateways." This is an effort to encourage residential homeowners to install backyard stormwater management practices and to disconnect downspouts from the stormwater infrastructure that leads to Brittain Creek.

8) Figure 3: Location of Brittan Creek sub-watershed



20. A detailed description of the project. Note: if project entails developing or implementing a Watershed Restoration Plan, see section 27. Expand space, if necessary

With this grant, we propose to:

1) Install and monitor three bioretention cells as retrofits on developed catchments on community sites within the Britton/Brittain Creek sub-watershed. These installations will serve 3 purposes:
   a) manage run-off from large paved areas, thus contributing to protection of Brittainn Creek and the receiving streams -- Mud Creek and the French Broad River.
   b) serve as highly visible demonstration projects that will anchor a campaign for individual landowner participation
   c) serve as research sites for NC State University, to inform best practices for stormwater management in the unique mountain environment of Western NC.

These projects will be designed, installed, and monitored by Dr. William Hunt, NC State University Department of Biological and Agricultural Engineering, and colleagues under his direct supervision (see #3 for statements of qualifications).

Two of the projects will be installed on the property of Opportunity House. Opportunity house consists of a building and paved parking areas adjacent to Britton Creek, with a 2-acre impervious footprint. One bio-retention cell is proposed at the northwest corner of the front parking lot, to capture and treat run-off from that parking lot that currently drains to Britton Creek. This bioretention cell would be roughly 1000 ft^2 in surface area.

A second bioretention cell is proposed at the northwest corner of the property, to capture and treat run- off from the back parking area, an adjacent property, and a small stretch of city road (see map, next page). These areas also currently drain to Brittain Creek. This bioretention cell would be about 300 ft^2, as limited space is available for the retrofit. These two projects would treat, in total, 1.5 acres of paved surface.

Opportunity House is "a membership-based, nonprofit organization that provides opportunities for participation in cultural, social, educational and recreational endeavors for all." (http:// opportunityhouse.org/History/history.htm). Opportunity House is the site of numerous classes, lectures, and other gatherings. As such, projects on this site will be highly visible in the community, with many residents passing by it as they come and go for their regular activities.

The Opportunity House Board of Directors has expressed interest and cooperation for installation of these projects on the property. A letter of support is included on page 22.

A third bioretention cell will be installed at Calvary Baptist Church in Hendersonville (see map, next page). The bioretention cell would be located on the south side of the property, and would drain the main parking lot and the roof of the church. In total, the bioretention cell would treat 2.5 acres of impervious surface and would be 1500 ft^2 in surface area. Currently, the runoff from the church and associated parking areas is conveyed through a culvert and into Brittain Creek. Similar to Opportunity House, this is a very public site, located on the major thoroughfare of Rte 191, with an active congregation.

The leadership of Calvary Baptist Church has expressed interest and cooperation for installation of these projects on the property. A letter of support is included on page 24.

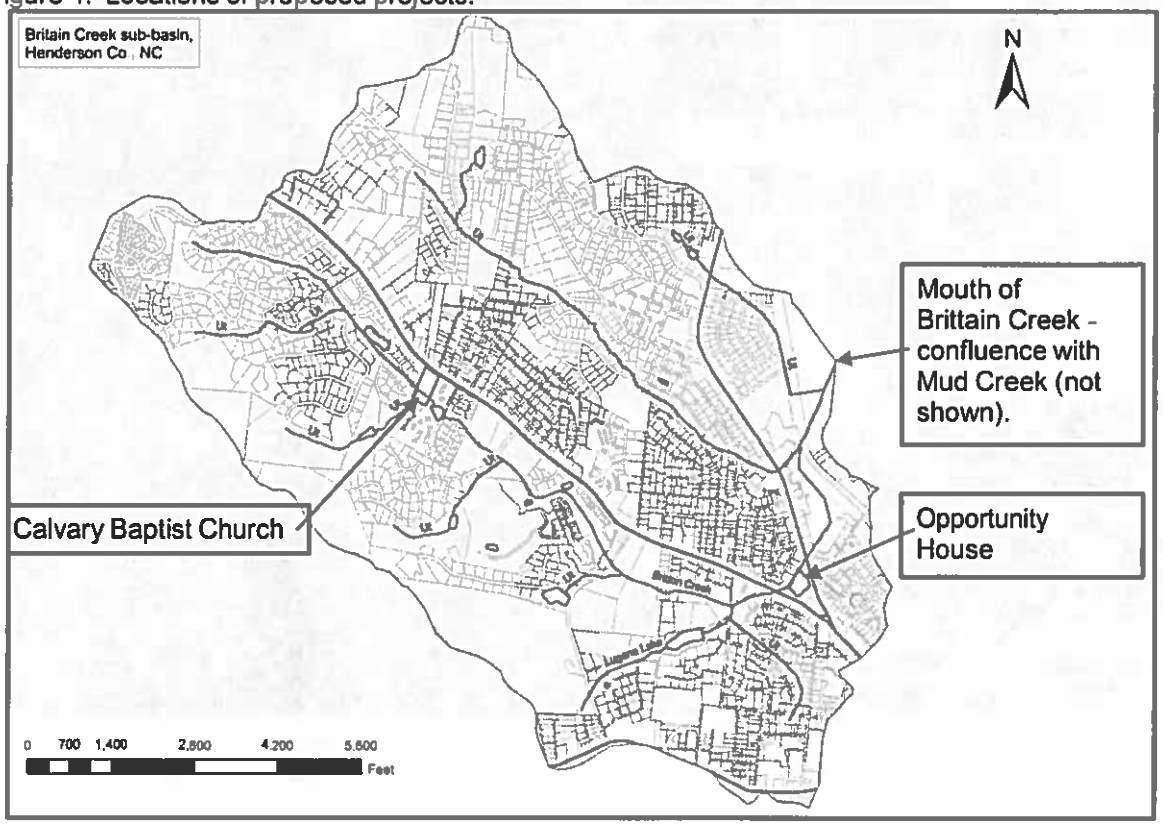
20. A detailed description of the project - cont.

Flow monitoring will be undertaken on all three bioretention cells, allowing for a better understanding of the hydrology of undersized bioretention systems. These data will provide greater information as to how bioretention reduces stormwater volumes and peak flow rates when not designed for the 80th percentile (1 inch) storm. Flow data will be monitored on a 2-minute interval. Since Britton Creek is a historical trout stream, we will also undertake extensive temperature monitoring. Inflow and effluent temperatures will be logged to allow for estimation of overall thermal load reduction from undersized bioretention cells. Monitoring will occur for one calendar year, with approximately 40-50 storm events observed over that time period. Temperature data will be logged on a 2-minute interval. City of Hendersonville staff will provide the labor to download the flow and temperature data once per month. The data will be electronically submitted to an NC State research engineer, who will review it for errors and report back to the City if needed. Data will be analyzed and presented in the form of a final report to NCDENR.

In addition, NC State University staff will work with NCDENR, engineering designers in the mountains, and NCDOT to write a Mountain BMP manual, which will be a supplement to the existing NCDENR stormwater BMP manual. It will detail and address major issues with design of all LID stormwater practices in the mountains, including high slopes, snowfall, near-surface bedrock, de-icing salt, plants for mountain stormwater practices, and maintenance for mountain stormwater practices. The document will be written in consultation with practicing engineers and regulators at the table. A draft document will be circulated to this group, with comments incorporated into the final draft. The process will take 1.5 years. A minimum of two face-to-face meetings in the mountains will be scheduled to complete this task.

This manual will be a valuable step forward in the continued effort to improve and protect the Mud Creek Watershed, as local watershed managers currently lack guidance on tailoring stormwater management practices to best suit our unique mountain conditions.

Figure 4: Locations of proposed projects.



20. A detailed description of the project - cont.

Figure 5 Opportunity
House
1411 Asheville Highway
Hendersonville, NC 28793
~ 1.5 acres to be treated by bioretention

20. A detailed description of the project - cont.

Opportunity House
A CULTURAL CENTER
Celebrating 50 Years

Wednesday, May 23, 2012

Division of Water Quality
319 Program

Dear Sirs,

This letter is to express support for the Mud Creek Watershed Restoration Project's application for grant funding to support stormwater BMPs in the Brittain Creek sub-basin of the Mud Creek Watershed.

As a landowner in the targeted area, we are interested in participating with the Mud Creek Project, should grant funds be available, to allow researchers from North Carolina State University to install two bio-retention practices on our property to manage stormwater run-off from surrounding paved areas.

This is not a contract, and does not obligate us to participate. However it is a statement of our strong interest in the project and our intention to participate should funding be available, pending no unforeseen future circumstances. The Board of Directors of Opportunity House approved this letter of intent to support this project at their Monday, May 21, 2012 meeting.

We look forward to participating with the Mud Creek Project to protect water quality in our community, and we urge you to support this grant application.

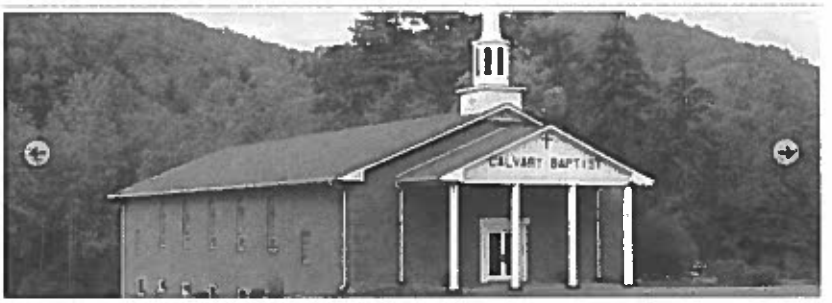
Sincerely,

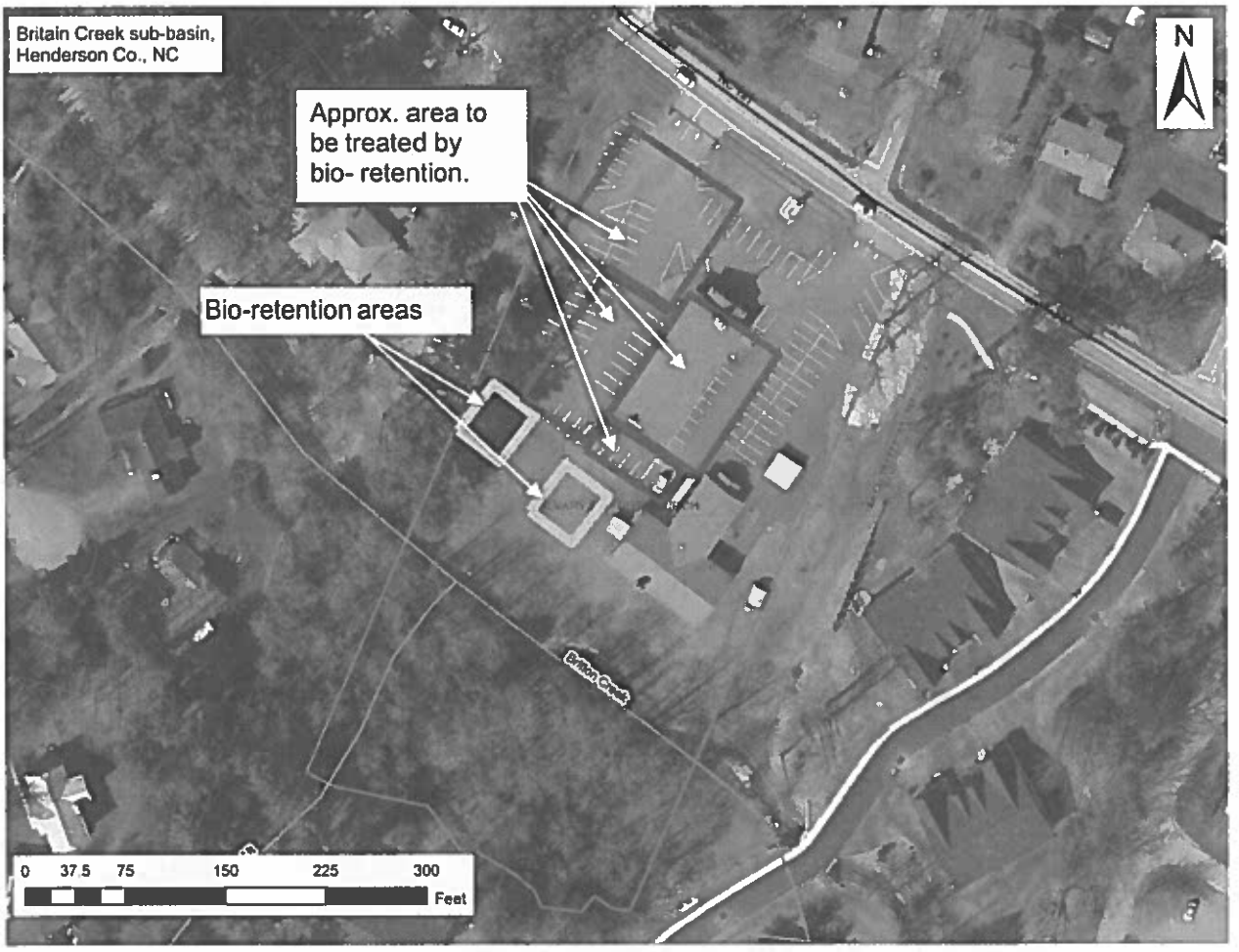
Douglas V. Moon
Executive Director

*Opportunity House, Inc. * 1411 Asheville Highway * Hendersonville, NC 28791*
*(828) 692-0575 * (828) 696-3546 FAX*

20. A detailed description of the project - cont.

Figure 6
Calvary Baptist Church
2501 Haywood Road
Hendersonville, NC 28793
3.36 acre parcel; ~ 1/2 impervious.
~ 2.5 acres to be treated by biore-tention





20. A detailed description of the project - cont.

CALVARY
BAPTIST
CHURCH

Making a difference in your life.

2501 Haywood Road
PO Box 1283
Hendersonville, NC 28793-1283
Phone 828-693-6014
Pastor Ken Mason

Letter of Intent

May 18, 2012

Division of Water Quality
319 Program

To Whom It May Concern:

This letter is to express support for the Mud Creek Watershed Restoration Project's application for grant funding to support stormwater BMPs in the Brittain Creek sub-basin of the Mud Creek watershed.

As a landowner in the targeted area, we are interested in participating with the Mud Creek Project, should grant funds be available, to allow researchers from NC State University to install bio-retention practices on our property to manage stormwater run-off from our parking lot.

This is not a contract, and does not obligate us to participate. However, it is a statement of our strong interest in the project and our intention to participate, should funding be available, pending no unforeseen future circumstances.

We look forward to participating with the Mud Creek Project to protect water quality in our community, and we urge you to support this grant application.

Sincerely,

Ken Mason

Ken Mason
Pastor

www.calvaryhvl.com

20. A detailed description of the project - cont.

Streambank stabilization and restoration -- Matching projects by the City of Hendersonville:

Provide bank stabilization and revegetation on at least 200 linear feet of streambank on Brittain Creek and/or its tributary branch.

The City currently has several stream restoration projects in the planning phase. They far exceed the matching funds claimed in the budget for this proposal. The exact order of implementation is not yet determined, but the City is committed to completing all of them. The City anticipates that all will be completed within the time period of this grant proposal. All three are described and included in the budget as evidence of the high level of investment being made in the watershed by the City government:

Comet Drive Streambank Stabilization / Sewer Replacement. 100 linear feet, both banks = 200 lf of bank, in the Britton Creek sub-watershed: This project is a result of aerial sewer crossing that has the potential to fail. The city will relocate the sewer on an adjacent property, then stabilize the stream bank. This will reduce the sediment load from current erosion and prevent further erosion and loading.

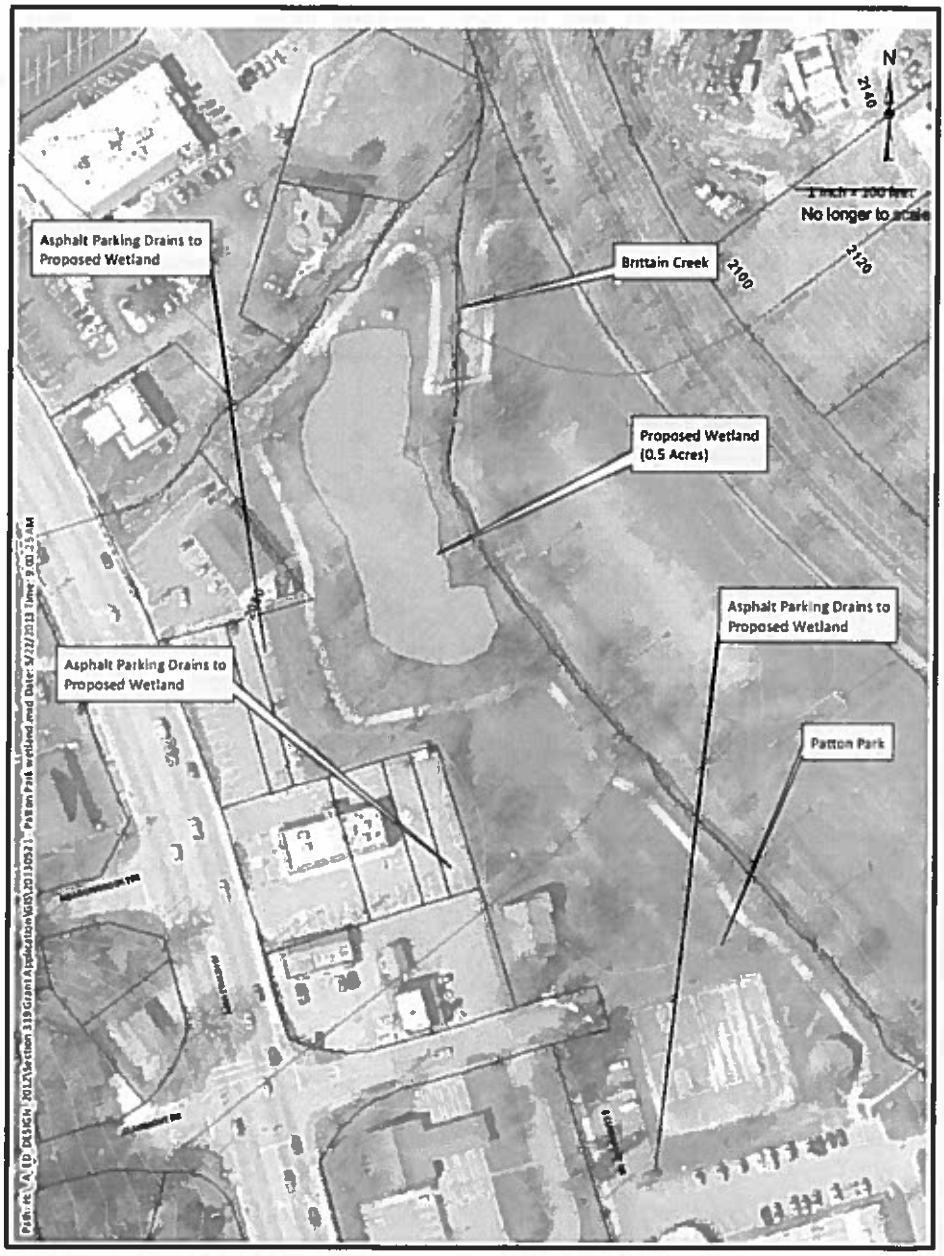
Jackson Park Sewer Stream Restoration. 150 linear feet, both banks = 300 lf of bank: This is a steam restoration at the confluence of Britton Creek and Mud Creek. The City will install almost 3 miles of sewer from Jackson Park to the Britton Creek/Mud Creek confluence. Near the confluence, an existing sewer is in danger of being exposed due to bank erosion. The new sewer will replace it, and the stream bank will be stabilized and restored to protect the new installation, including geo-lifts, and boulder vanes.

Figure 7: Location of City of Hendersonville streambank stabilization projects in the Britton Creek sub-watershed. From the Britton Creek Stormwater Master Plan, McGill Associates, for the City of Hendersonville, June, 2011.

20. A detailed description of the project - cont.

As part of the City of Hendersonville Phase II Stormwater Program, the city intends to convert an existing wet pond at Patton Park to a designed stormwater wetland. The wetland provides an efficient biological method for removing a variety of pollutants in a managed environment. This will greatly improve water quality within site vicinity, specifically removing pollutants from nearby paved areas that currently flow into Brittain Creek.

Figure 8: City of Hendersonville pond-to-wetland conversion project in the Brittain Creek sub-watershed.



20. A detailed description of the project - cont.

Continue monitoring efforts throughout the watershed, via the VWIN program, to keep data current on the state of the watershed.

The Volunteer Water Information Network (VWIN) is a well-respected citizen water monitoring program in which water samples are collected every month by volunteers, and analyzed in a professional lab for 11 water quality parameters.

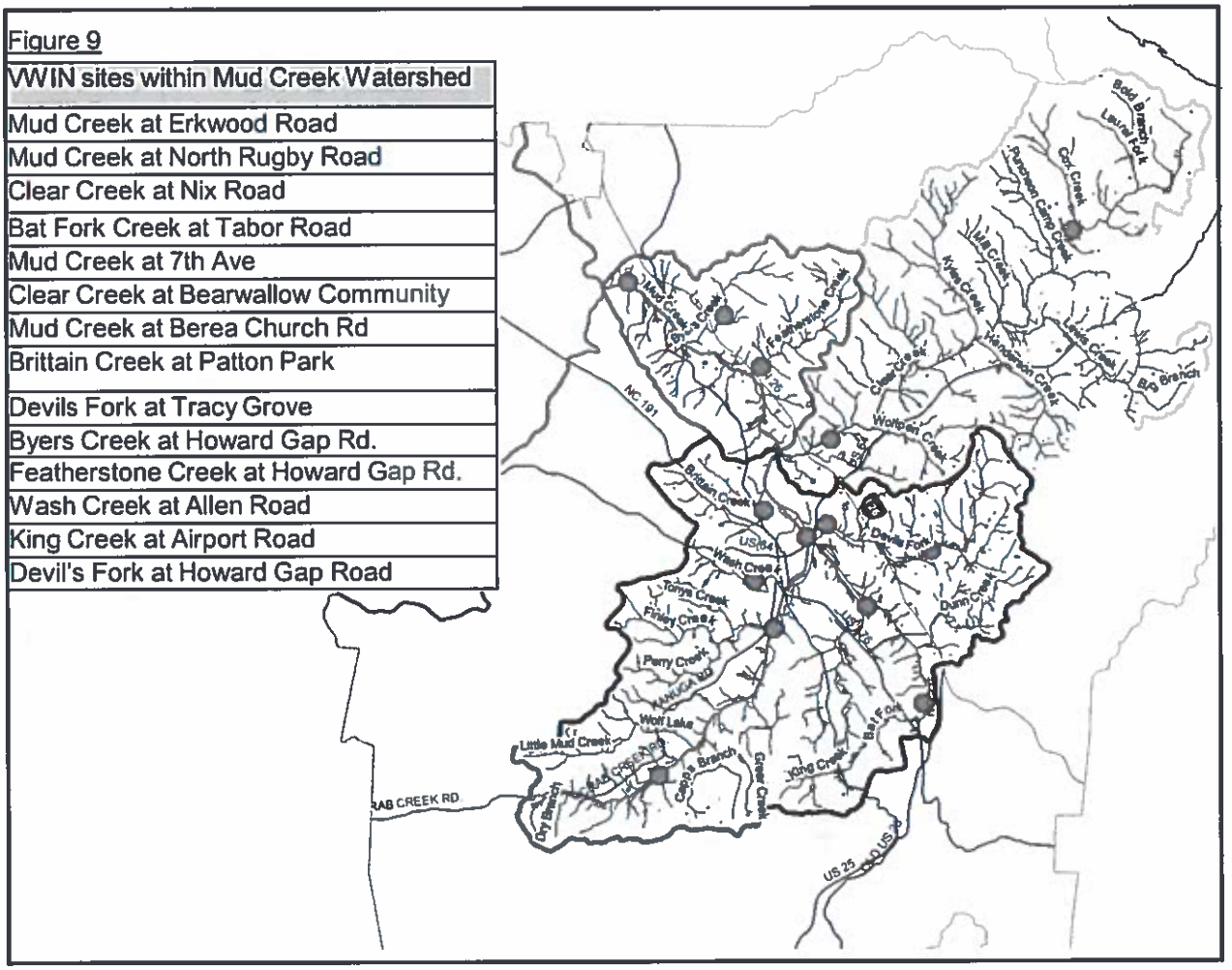
Monthly monitoring at 6 sites in the Mud Creek watershed has taken place through VWIN since 1992, with 3 more sites added in 1998 and five more sites added in 2011. This data has been extremely valuable in keeping a pulse on the state of the watershed. Maintaining continuity in this data is critical to its usefulness, and will keep the Mud Creek Project well positioned to set priorities for continued work in the future.

Funding is sought for 14 VWIN monitoring sites, to ensure this work is not discontinued. See figure 9 for a list and map of locations.

The VWIN analysis is carried out by Environmental Quality Institute, with local sampling managed by the Environmental and Conservation Organization (ECO), of Henderson County. Both partners have expressed capability and willingness to continue the VWIN program as described.

Figure 9

VWIN sites within Mud Creek Watershed
Mud Creek at Erkwood Road
Mud Creek at North Rugby Road
Clear Creek at Nix Road
Bat Fork Creek at Tabor Road
Mud Creek at 7th Ave
Clear Creek at Bearwallow Community
Mud Creek at Berea Church Rd
Brittain Creek at Patton Park
Devils Fork at Tracy Grove
Byers Creek at Howard Gap Rd.
Featherstone Creek at Howard Gap Rd.
Wash Creek at Allen Road
King Creek at Airport Road
Devil's Fork at Howard Gap Road



20. A detailed description of the project - cont.

Continue general education to encourage both private and public efforts to improve water quality. Efforts tied to this proposal include installing interpretive signs at the 3 BMP sites, and including educational material in water bills of residents in the Brittain Creek sub-watershed. Efforts are aimed at promoting "downspout disconnects" and "groundwater gateways," to encourage residential homeowners to install backyard stormwater management practices on their property. We aim to secure a list of interested and willing participants for future project installations.

Provide administration of the watershed project, including:

- Carry out grant administration - quarterly reports, invoicing, budget management, project documentation, etc.
- Continue to coordinate efforts among Mud Creek project partners in order to maximize the impact in the Mud Creek watershed of the many agencies and organizations who contribute to the various niches of watershed work. (Facilitate meetings, collaborations, promote continued work on the strategic plan by watershed partners).

Funding is requested for a 10% FTE position for education and project coordination.

21. Monitoring/Environmental Data Collection Describe in section below how project data will be used (i.e. demonstrate effectiveness of BMPs installed, calculate load reductions, data to be used for TMDL development, data to be used for State use support purposes, etc.). If monitoring is needed to document a demonstration project or water quality improvement, a Quality Assurance Project Plan (QAPP) will be required (reviewed and approved by DWQ). For a QAPP template, visit the 319 Program website at http://portal.ncdenr.org/web/wq/ps/nps/319program/applyfor319

Project Monitoring of the bioretention cells will be used to demonstrate effectiveness of BMPs, and to inform development of a stormwater BMP manual for the mountain conditions of Western North Carolina.

See page 20 for description of planned monitoring. QAPP to be submitted.

General Watershed Monitoring - to maintain current data on the state of the watershed for future project planning:
Chemical monitoring will be carried out under the VWIN program monthly at 14 sites within the water- shed. QAPP on file for current 319 contract. Will be re-submitted if required.

22. Public Involvement

This project involves the public in many ways:

- Private landowners have been secured, and more will be contracted, as willing participants for voluntary stormwater BMPs that will help protect water quality.
- Volunteers collect water samples monthly under the VWIN program.
- The public is the target of all general education efforts.

23. List Project Outputs and Products (All 319 funded projects are required to submit Quarterly Progress Reports and a detailed Final Project Report, which must be submitted at least *30 days before* the end of the contract for DWQ review and approval.)

1) Installation of three bio-retention areas for stormwater management at two highly impervious sites.
2) Monitoring of the three new bio-retention areas for one year.
3) Creation of a stormwater BMP manual (supplement to the state manual) specific to the mountains of Western NC.
4) Stabilization of at least 200 linear feet of eroding stream bank (matching project).
5) Monthly monitoring of 14 VWIN sites within the Mud Creek watershed.
6) Installation of educational / interpretive signage at the three community project sites, plus additional educational efforts as time allows.
7) 8 quarterly reports and 1 final report.

24. Projects Developing or Implementing a Watershed Restoration Plan must include EPA 's 9 Key Elements for Watershed Restoration Plans. Draft Plans must be submitted to DWQ for review and approval at least *60 days before* end of the project/contract period (use additional pages if necessary).	
1	An **identification of the causes and sources** or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed
2	A **description of the NPS management measures** that will need to be implemented to achieve load reductions as well as to achieve other watershed goals identified in the watershed based plan
3	An **estimate of the load reductions** expected for the management measures
4	An **estimate of the amount of technical and financial assistance needed** associated costs and or sources and authorities that will be relied upon, to implement the plan
5	An **information/education component** that will be used to enhance public understanding of the project
6	A **schedule for implementing the NPS management measures** identified in this plan that is reasonably expeditious
7	A description of interim, **measurable milestones for determining whether NPS management measures** or other control actions are being implemented
8	A set of **criteria that can be used to determine whether loading reductions are being achieved** overtime and substantial progress is being made towards attaining water quality standards
9	A **monitoring component** to evaluate the effectiveness of the implementation efforts over time measured against the criteria established under item 8.

This application can be considered implementation of two plans - the general Mud Creek Strategic Plan and the more recent and more specific Stormwater Management Plan for Brittain Creek. The Mud Creek Strategic plan draws upon data from the DENR-DWQ WARP study conducted in 2000-2002, and from the TVA IPSI database completed in 2001. The Brittain Creek stormwater master plan was produced in 2011 by McGill Associates, under contract for the City of Hendersonville. It is currently being formatted into the required 9-element format as part of a current 319 grant contract, and will be complete by the end of the contract period. All referenced documents are available online at http:// www4.ncsu.edu/~dfsilve2/Reports-GuidingDocs.html.

Following is brief information summarized from and referencing details in the two plans, addressing just the specific deliverables proposed in this application:

1) *An **identification of the causes and sources** or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed:*

The 2003 WARP study indicates that habitat degradation due to sedimentation, channelization and lack of riparian vegetation, as well on toxicity from non-point souce run-off, are causes of impairment in Mud Creek. Urban stormwater runoff is identified as a primary contributor to these causes. Stormwater run- off carries pollutants that contribute to toxicity. It also increases the volume of water in stream channels during storm events, leading to erosion of streambanks.

24. EPA 's 9 Key Elements for Watershed Restoration Plans - cont.

The Britton Creek Master Stormwater plan documents sediment depositions in Britton Creek and it's primary tributary (Tributary 2) and concludes that erosion of streambanks resulting from high volumes of stormwater run-off are the most likely sources of these sediment loads.

2) *A **description of the NPS management measures** that will need to be implemented to achieve load reductions as well as to achieve other watershed goals identified in the watershed based plan.*

Anticipated measures include stormwater management BMPs throughout the area to control run-off from impervious surfaces. These measures include primarily raingardens, created wetlands, and other bio-retention practices, and cisterns and rainbarrels and other water harvesting practices. Early demonstration projects suggest that green roofs, permeable pavement, and other stormwater practices are either very expensive for broad use on residential homes, or are only moderately effective in the mountain environment. Other practices to control the impact of high volumes of runoff at the outlet of storm drain pipes might be included, based on engineering recommendations. In addition, restoration of eroded stream banks and channels will be needed to control sediment from these sources.

3) *An **estimate of the load reductions** expected for the management measures.*

Load reductions for the current practices proposed are reported in Section 9 (p. 8). These are estimates based on modeling. One important purpose for the proposed work is to carry out the needed research to document reduction in pollutant loads from the practices described.

4) *An **estimate of the amount of technical and financial assistance needed** associated costs and or sources and authorities that will be relied upon, to implement the plan.*

Taken together, it will require millions of dollars over time to retrofit the high-density urban housing that dominates the land use in the watershed, OR to install end-of-pipe practices to manage the volume of water collected from the surrounding neighborhoods and directed into Brittain Creek. However, the majority of imperviousness in the watershed is residential private property. If momentum can be built to create a culture of stewardship at the neighborhood level, the investment needed by each individual property owner is manageable. Just as non-point-source pollution consists of the cumulative impact of many small inputs, the solution can be achieved through the cumulative impact of many small, manageable practices on an individual scale. This is why education is so critical to long term success. Changing cultural norms takes time, but a continuous presence in the media and in the community, keeping the problems and solutions on the "front burner" is one of the most affordable strategies for long-term success. Concurrently, the tremendous volume of work needed requires that it be approached in small, incremental pieces that can be managed in short-term time-frames, and based on funding available over time.

The technical assistance needed is the research to inform how to tailor stormwater management practices that have been developed in the Piedmont and coastal regions of the state. For example, the most commonly used models for estimating pollutant load reductions focus on nitrogen and phosphorous removal. Much of the current research that guides BMP specifications and performance

predictions is based on response to the nutrient problems in the Neuse and Tar-Pam watersheds. In the mountains, the primary concerns are sediment that results from erosion, which is exacerbated by the preponderance of steep slopes, and heat impacting mountain trout waters. Research is needed to provide the needed guidance for best practices to address these issues. The research proposed in this application is a good start.

Primary partners who will be involved in implementing the plan likely will be:

- City of Hendersonville - water department and City Engineer - installation of BMPs and stream restoration
- Henderson County Dept. of Extension - Education & Outreach
- NC State Univ. Dept. of Biological and Agricultural Engineering - technical support for BMPs and stream restoration engineering
- Environmental and Conservation Organization - volunteer participation, and ongoing watershed monitoring

Note: The Henderson County Dept. of Soil and Water has been an active partner in the past. Current politics prevent them from participating at this time, but we hope that over time, they will again have the political latitude to contribute to these efforts. Installation of BMPs and stream restoration falls most naturally in their niche of work. We hope they will be allowed to provide services in support of the Mud Creek Project in the future.

Additional partners involved in consultation, advice, planning, etc. over time may include:

- Henderson County NRCS District Conservationist
- Henderson County Planning Department, including Planning Director and stormwater officer
- Henderson County Engineer
- Ecosystem Enhancement Program
- Riverlink
- Land of Sky Regional Council of Governments
- Henderson County building community (Homebuilders' Association)

*5) An **information/education component** that will be used to enhance public understanding of the project*

As discussed above, an ongoing comprehensive public education campaign is a key component of the watershed plan to encourage and motivate homeowners throughout the watershed to participate in stormwater management practices. Education strategies include:

- Regular media presence discussing the impact of stormwater runoff and the widely needed strategies for managing it, carried in the local newspaper, on local radio, and in online forums.
- Production and promotion of a series of downloadable podcasts educating about stormwater management.
- Continuing seminar-style presentations to civic organizations, community groups, church groups, homeowners' associations, interest groups, realtors, etc.
- Technical training workshops on installation and maintenance of bio-retention and water harvesting practices for residential homes, for homeowners as well as contractors.
- Education of the next generation of citizens and homeowners through school-based programs